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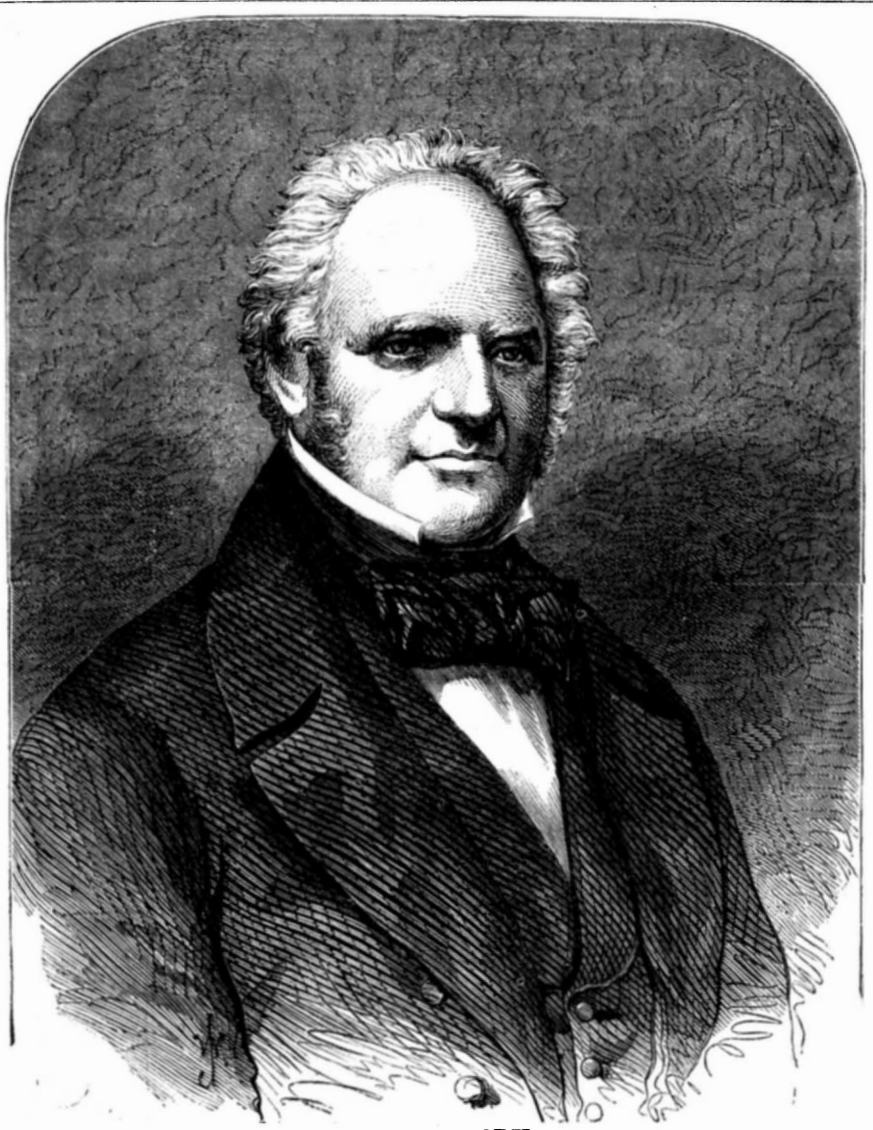
George Peabody and his Munificent Gifts.

We give herewith an engraving of four blocks of tenement houses erected at Islington, in London, for the accommodation of the poor of that great metropolis. The funds were furnished by that benefactor of his age, Mr. George Peabody, a very accurate portrait of whom we also present to our readers. The site of these buildings has been named for him Peabody Square. His gift, a portion of which—$158,450 —has been appropriated to the purchase of the land and the erection of the buildings, amounts to the princely sum of $2,250,000.

These buildings are five stories in hight, each block being sufficient for the accommodation of sixty families, or two hundred and forty in the aggregate. Notwithstanding their utilitarian purpose, they are, as will be seen by a reference to the engraving, sightly and even imposing edifices. The rooms average nine by twelve feet square, and are let as desired, either singly, two, or three together, the weekly rent ranging from about sixty-two cents for one room to about $1.25 for three. The qualification for a tenant is merely a condition in life fairly bringing him within the category of one of "the poor of London." Ventilation, cleanliness, water, and facilities for washing, etc., are amply provided for. Other buildings have been erected or are in process of erection in other parts of the great city by means of this donation. Mr. Peabody is now in this country, of which he is a native, having been born in Danvers, Essex Co., Mass., in 1795, and is therefore, seventy-two years old. He is one of the most remarkable of living men. If the style of "self-made" is ever appropriate Mr. Peabody deserves it. His parents were poor, and at the early age of eleven years he was compelled to earn his living as a grocer's clerk until his fifteenth year, when he occupied a similar position in a small dry goods store. Afterwards he went into a mercantile business at Georgetown, D. C., and subsequently settled in Baltimore, from which city he went to England, making several business visits. In 1837 he took up his residence in London, and since then his course is more or less familiar to the people of both hemispheres. For many years the banking house he established has been the headquarters of Americans visiting England and the center of American news and intelligence. His benefactions, which have been made public by reason of their magnitude, begun in 1852, when on the occasion of the bi-centennial of the settlement of his native town, Danvers, he sent, in a sealed envelope, a check for $20,000, subsequently raised to $250,000, for the founding of an institute, lyceum, and library.

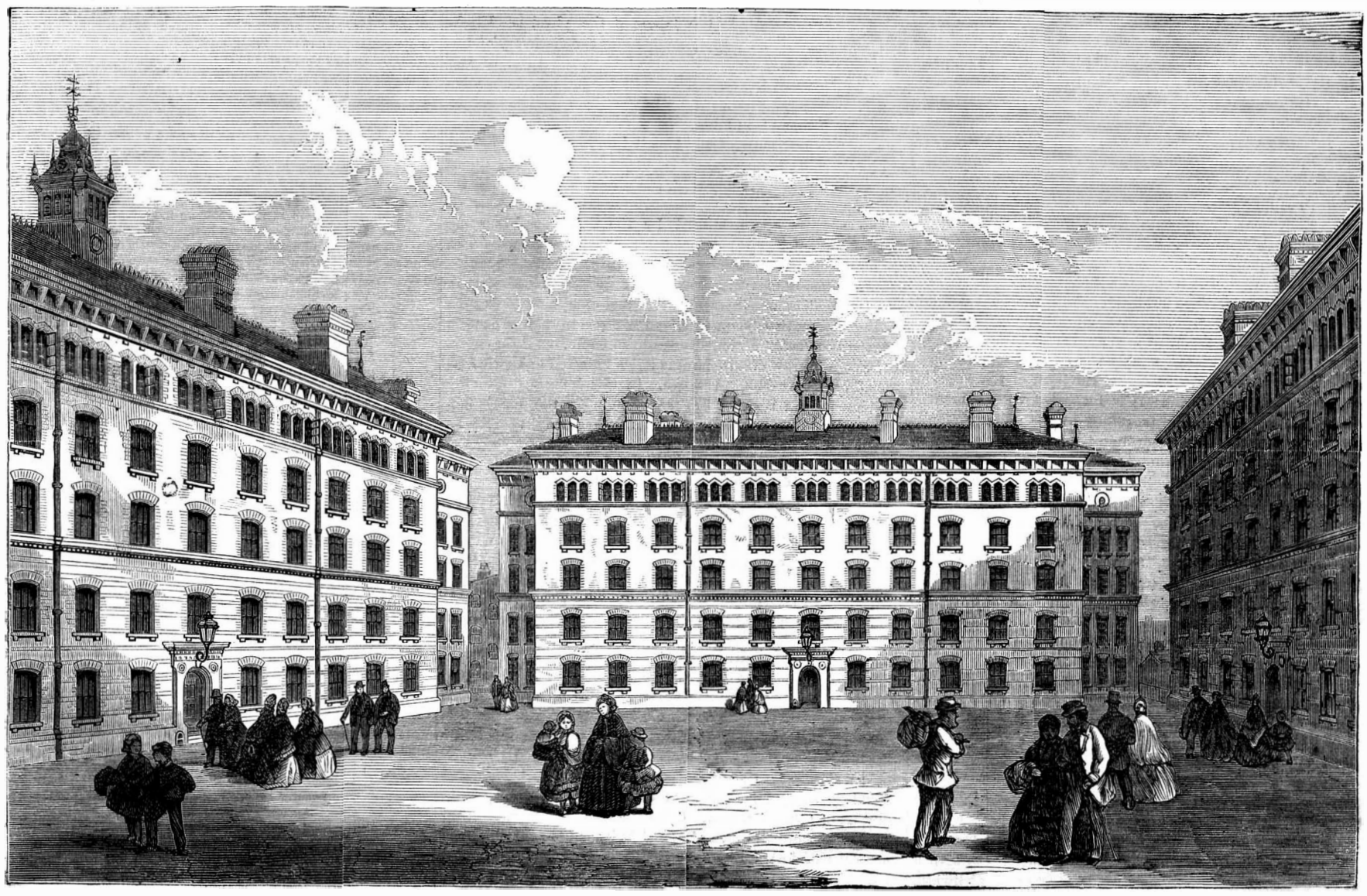


GEORGE PEABODY.

We give a list of his most prominent and important benefactions, by which it will be seen that he remembers gratefully the people of those towns in which he has resided, being, in this country, Danvers, Salem, Newburyport, and Georgetown, Mass; Thetford, Vt., and Baltimore, Md.:—

The Poor of London	$2,250,000
Town of Danvers	250,000
Grinnell Arctic Expedition	10,000
City of Baltimore	1,000,000
Phillips Academy	25,000
Massachsetts Historical Society	20,000
Harvard College	150,000
Yale College	150,000
To the South	1,500,000
Memorial Church in Georgetown, Mass	50,000
Free Public Library in Georgetown, Mass	15,000
Free Public Library in Newburyport, Mass	15,000
Free Public Library in Thetford, Vt	5,000
United States Sanitary Commission	10,000
Maryland Historical Society	20,000
Kenyon College	25,000
Essex Institute, Salem, Mass	140 000
Other public gifts, at least	30',000
Total	$5,665,000

Such a record is one of which even a king might be proud. Indeed, it is doubtful if any potentate has ever done more for the benefit of his kind than this American merchant and banker. And the conditions of his donations are such that the poorest can reap the benefits. He has chosen rather to accomplish the useful than to gain a notoriety for splendor evidenced in mere show.



HOMES FOR THE POOR—PEABODY SQUARE, ISLINGTON, LONDON.

GREEN VITRIOL FROM IRON SLAG.—A sulphate of iron which is esteemed by dyers, according to M. Ch. Mène, may be produced from the slag of iron forges more cheaply than in any other way. It is pulverized and mixed with sulphuric acid, then heated in an oven to eliminate the hydrated silica, the residuum treated with boiling water, and made to crystallize

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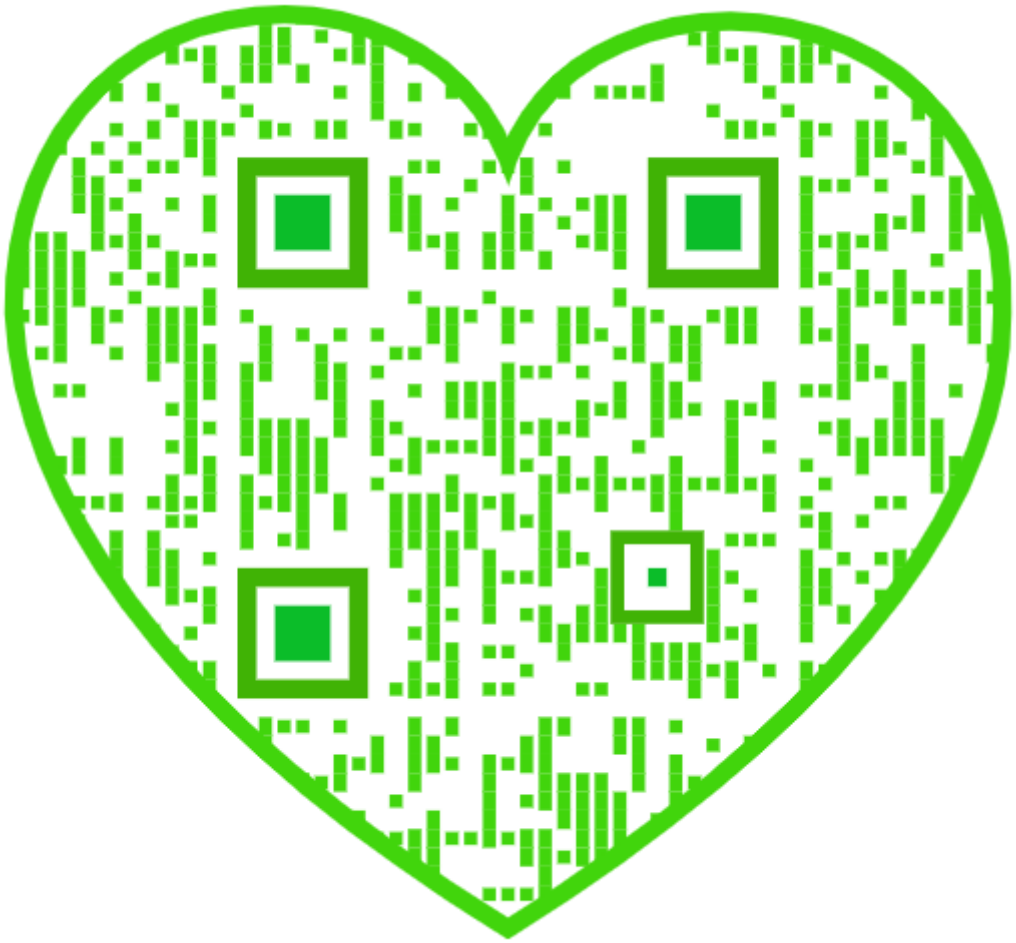

Science Familiarly Illustrated.

The Earth Worm.

Probably there are few boys who read the SCIENTIFIC AMERICAN who do not occasionally indulge in the sport of angling, if not for sport at least for the pleasure of enjoying the fruit of their exertions—if successful—when brought to the table. It is well that we put in this proviso, for "fisherman's luck" is a phrase every boy understands. No fish bait is so generally used in angling as the earth worm, and we shall endeavor to give some information in regard to this despised, but useful creature, which boys who often handle it may not possess.

The earth worm belongs to the class called annelids, from the Latin *anellus*, a small ring, because the body of the worm appears to be composed of a series of small rings joined together like beads on a string. The worm has also another name, *Lumbricus Terrestris*, which is simply the Latin for earth worm, so this apparently insignificant creature bears a high sounding name. And he is worthy of it. He is a remarkable individual, belonging to the only class of invertebrate animals which have red blood. This is quite a distinction, one which many animals much higher in the scale of life do not enjoy.

We have said this is a useful animal. We do not refer to its value as bait for fish, but its usefulness as a cultivator of the soil. It does, beneath the surface, just what the farmer does on the surface, opens the soil to the action of air and moisture by running galleries in every direction. It does even more. It is a superior worker of fertilizers, turning crude and rank manure to valuable compost, fit for the support of vegetable life. If not allowed to do this in the heap, it will carry on the work after the manure has been removed to the field or garden. But this does not exhaust the list of its useful qualifications. It actually turns poor and grudging soil in some cases to valuable and generous mold. In dry times the worm is driven by the necessities of his nature deeper into the earth, as he cannot live in dry soils. When he returns to the surface he brings with him the earth he has swallowed—for he is an earth eater, but of this presently—and voids it upon the surface. And this which he leaves upon the surface is of the very finest quality. Every one has seen these worm castings heaped about the mouth of their holes.

Thus the manures added to the soil by man and the constituents of the soil, themselves, are thoroughly mingled by this indefatigable cultivator, and these castings in time accumulate on the surface, so that instances have been known where several inches of vegetable mold have been added by this means to the surface of a field. In this manner the earth worm proves himself to be one of the farmer's best friends and assistants.

Now let us see whether he, like some of the feathered tribe, has some bad qualities which offset his usefulness. He certainly does not destroy living vegetation, either roots, stems, or leaves; for even those who deny that he is a dirt eater do not charge him with eating living plants. They merely assert that he eats dead and decaying vegetation. A correspondent in our issue of Feb. 9th, gave a well written description of what he had seen him do; eating decayed leaves, and minutely described his process of feeding. The worst that can be said of him is that he defaces our nicely kept walks by his nocturnal deposits of exuviæ.

What does the earth worm eat? This is a disputed question, but we incline to the opinion expressed by Samuelson and Hicks in their treatise on "The Earth Worm and the Common Housefly;" Jean Mace, in his "History of a Mouthful of Bread;" Appleton's Eyclopedia, art. Earth Worms and Annelids; Chambers Educational Course, art. Zoology, and Prof. Seeley in No. 2 current volume SCIENTIFIC AMERICAN, that the earth worm does eat dirt, as much as the Ottomacs, those South American Indians described in "Odd People" by Capt. Mayne Reid. Most boy anglers will also agree with these authorities that the earth worm is a dirt eater, with the exception, perhaps, of the boy who while fishing was asked by an acquaintance passing what he had in his mouth, and replied: "Wums fur bait."

A few other peculiarities of this animal and we will release him and our readers. The swelled protuberances enveloping the body of worms at some seasons, must have been noticed by all who have seen them. These appear like the results of disease or accident, but are simply the envelopes of the ova for the reproduction of the animal. The head of the worm is destitute of eyes and ears. It is furnished with a mouth alone, which may be easily perceived by the aid of a small lens or microscope. Take a worm on your hand and let him crawl across the palm and you will feel a rough sensation on your skin. Or attempt to pull a worm out of a hole in the earth and very likely you will break his body in two. Why? Simply because the worm has legs, or at least, substitutes for them. These substitutes are hair hooks, easily seen through a common magnifying glass and they are retractile at the will of the worm. This will explain the tenacity with which he adheres to the walls of his home when force is used to pull him out.

If this brief account of some of the peculiarities of this reptile are of interest and prompt a wish for more, we refer our juvenile readers to Messrs Samuelson and Hicks book or the interesting volume of Mons. Mace, before alluded to, and also to a close observation of the habits of the *Lumbricus Terrestris*.

The Dental Profession.

The dental art is one of the beneficent products of the nineteenth century. There are men now living who cared for it in its infancy. In 1820, throughout all this country only about one hundred dentists could be found, and these with a few yet conspicuous exceptions were illiterate and awkward. In 1840 the number had increased to 1,000. At the present time there are probably 8,000. The art of dentistry has now become one of our necessities, and its practitioners are a well recognized and honored profession.

Books and periodicals devoted to dentistry, of a high order of literary and scientific merit. are constantly being published. To be qualified for the successful practice of dentistry nearly as much study is required as for divinity or medicine. Several colleges for the education of dentists have been instituted and are in successful operation. There is little doubt that in a few years a high standard of education will be so generally appreciated, that the diploma of a dental college will become a necessary passport for admission to a respectable place in the professien. And it may even be hoped that the dental profession may rank evenly with other learned professions.

Our constant respect for the dental art was greatly stimulated by attending the first commencement of the New York College of Dentistry, which took place at Steinway Hall on the 6th inst. The venerable Dr. Eleazar Parmly presided, and Mayor Hoffman, Dr. Frank H. Hamilton, and Dr. Allport took prominent parts in the exercises. Those who witnessed the dignified proceedings of the occasion cannot doubt that this college is one of the most worthy and successful of our educational institutions.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American In stitute, was held on Thursday evening, February 27th, Prof. Tillman presiding.

NOVELTIES.

After the reading of the usual scientific summary by the President and an opportunity being given for bringing forward new inventions for the inspection of the Club, Dr. Fitch presented a sample of white lead prepared directly from litharge by dissolving it in nitric acid, precipitating by sulphuric acid, and boiling in oxalic acid, the whole process being completed within two hours. A hand shoe-pegging machine of ingenious construction was exhibited and operated to the satisfaction of the members. The inventor claims that by its use he can peg a pair of boots per minute, the work consisting of cutting the pegsfrom long strips of birch wood, punching the holes and driving a double row of pegs. The machine is designed to enable small manufacturers to successfully compete with the large establishments. Mr. Maynard showed a piece of copper tubing, the ends of which were quite intricately entwined, the flexures showing no crack or edge. The hollow ingot from which this tube was formed, he stated, had been rolled until it had acquired a laminated structure and great flexibility.

THE HYDROGRAPHIC BASINS OF THE UNITED STATES.

Dr. Stephens read a long and able article on this subject, describing first the geological formation of this continent, and entering at some length into statements respecting the agricultural and mineral wealth of each of the resulting hydrographic basins, showing the capacity of each for supporting an immense population, and closed by drawing a glowing picture as to the future history of this nation.

At the conclusion of Dr. Stephen's paper, Prof. Van der Weyde was introduced and explained the construction of a new

SPECTROSCOPE.

It is more especially to the labors of the physicists Kirchhoff and Bunsen that we are indebted for the discovery of the spectral analysis. They ascertained that the salts of the same metal, when introduced even in the minutest quantity in a flame always produce lines in the spectrum identical in color, position, and number. In toxicology it is no longer necessary to test successively for all the known poisons, but by the lines in the spectrum, given by burning a small quantity of the suspected compound, the presence or absence is instantly seen.

The spectroscope exhibited by the Professor has some marked advantages over the ordinary instrument, which, in the form usually employed, consists of three telescopes mounted on a common foot whose axes converge towards a prism of flint glass. The new instrument, is a simple teleoscopic tube having within, two triangular, and two rectangular prisms so that the tube being directed toward the flame, the light enters through a narrow crevice, and is twice reflected and twice refracted before reaching the eye. In this improved form the spectroscope can be used in connection with the magic lantern and the spectra from various flames may thereby be shown to a large audience.

Trial of Horse Hay Forks.

A series of interesting competitive trials to determine the merits of the various horse forks now in market, took place on Monday and Tuesday the 5th and 6th inst. at Rye village in Westchester county, on the premises of Mr. Josiah Macy. The trials were conducted under the auspices of the American Institute, and sixteen forks were entered for competition. A tabulated statement of the general results is given below:—

	Where manufactured.	*Lbs. removed.*	*Time*
Blodgett's cats-claw fork	Watertown, N. Y.	1,500	9:30
Davidson's hay knife and fork	Troy, Pa.	1,607	9:45
Sprout's hay fork and knife	Muncy, Pa.	1,850	5:50
Chapman's grappling fork	Utica, N. Y.	2,180	12:00
Reynolds' Union fork	Stockport, N. Y.	2,050	21:00
Excelsior Palmer fork	Hudson, N. Y.	1,330	8:05
Rodgers' harpoon fork	Pittsburg, Pa.	1,382	8:30

A fork manufactured by the Ames' plow company of this city, failed to operate satisfactorily and was removed from the field: a similar fate befel the forks entered by J. S. Brown of Washington, by M. E. Plumm of Munson, Ct., and by L. L. Johnson of Chatham, N. J. Our data are defective respecting the work performed by the Halsted fork made in this city, the Case harpoon fork, entered by E. Sharkley of Lewisburg, Pa; Walker's harpoon fork, Buckman's grappling fork, and the Farmer's Friend entered by C. N. Culver, Bowling Green, Ohio. Of the sixteen, forks exhibited, eleven were of the harpoon pattern: of the remainder, two were grappling and three were claw forks. The several trials were witnessed by a large assemblage of practical farmers and general satisfaction was expressed at the admirable manner in which nearly every machine did the work assigned. The decision of the committee appointed by the American Institute, has not yet been made public.

REPORT OF THE COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January 30, 1867.

SIR:—I have the honor to submit the following report of the business of this office during the year 1866:—

The receipts and expenditures of the office for the year, and the condition of the Patent Fund at its close, are shown by the following statements:—

No. 1.

Number of applications for patents during the year	15,269
Number of patents issued, including reissues and designs	9,430
Number of caveats filed	2,723
Number of applications for extensions of patents	67
Number of patents extended	58
Number of patents expired	1,042
Of the patents granted there were—	
To citizens of the United States	9,210
To subjects of Great Britain	127
To subjects of the French Empire	48
To subjects of other foreign governments	65

No. 2.

Statement of money received during the year, namely:

On applications for patents, reissues, etc.	$460,798 20
For copies and recording assignments, etc.	34,867 18
Total	$495,665 38

No. 3.

Statement of Expenditures.

For salaries, including $29,107·48, additional pay as per act of June 18, 1866	$149,623 17
For contingent expenses	95,006 60
For temporary clerks	115,381 76
For withdrawals	540 00
For refunding money paid by mistake	924 00
For fees to judges in appeal cases	248 75
Total expended	$361,724 28

No. 4.

Statement of the Condition of the Patent Fund.

Amount to the credit of said fund Jan. 1, 1866	$130,184 78
Amount of receipts during the year	495,665 38
Total	$625,850 16
From which deduct the amount of expenditures	361,724 28
Leaving to the credit of the Patent Fund, Jan. 1, 1867	$264,125 88
Surplus of receipts over expenditures during the year	$133,941 10

TABLE *showing the business of the office for thirty years ending December* 31, 1866.

Years.	Applicati'ns filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	....	....	435	$29,289 08	$33,506 98
1838	....	....	420	42,123 54	37,402 10
1839	....	....	425	37,260 00	34,543 51
1840	765	228	473	38,056 51	39,020 67
1841	847	312	495	40,413 01	52,666 87
1842	761	291	517	36,505 68	31,241 48
1843	819	315	531	35,315 81	30,766 96
1844	1,045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,531	553	572	68,111 19	41,878 35
1848	1,623	607	660	67,576 69	58,905 84
1849	1,955	595	1,070	80,752 78	77,716 44
1850	2,193	602	995	86,927 05	80,100 95
1851	2,258	760	869	95,738 61	86,916 93
1852	2,639	996	1,020	112,056 34	95,916 91
1853	2,673	901	958	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	216,459 35	179,540 33
1856	4,960	1,024	1,502	192,588 02	199,931 02
1857	4,771	1,010	2,910	196,132 01	211,582 09
1858	5,364	943	3,710	203,716 16	193,193 74
1859	6,225	1,097	4,538	245,942 15	210,278 41
1860	7,653	1,084	4,819	256,352 59	252,820 80
1861	4,643	700	3,340	137,354 44	221,491 91
1862	5,038	824	3,521	215,754 99	182,810 39
1863	6,014	787	4,170	195,593 29	189,414 14
1864	6,972	1,063	5,020	240,919 98	229,868 00
1865	10,664	1,063	6,616	348,791 84	274,199 34
1866	15,269	2,723	9,450	495,665 38	361,724 28

The foregoing shows that the number of applications for patents received in 1866 exceeded that of 1865, by nearly fifty per cent, and that of 1864 by more than one hundred per cent; and the number of caveats filed exceeded that of 1865, by nearly two hundred per cent. The number of patents issued exceeded that of 1865 by nearly fifty per cent, while that of 1865 exceeded any previous year by more than thirty per cent.

The receipts into the patent fund exceeded that of 1865 by more than forty-two per cent, while the expenditures were increased less than thirty-three per cent, and 1865 exceeded that of any previous year in receipts by more than thirty-six per cent.

If the business of the Office continues to increase as now, and as it has for several months last past, it is not unreasonable to suppose that the number of applications during the present year will amount to nearly, if not quite twenty thousand. This very great increase of the business of the Office renders it absolutely necessary, that the clerical and examining force be correspondingly augmented, and this cannot be done without providing more room than we now have, as every room we have is filled far beyond its utmost reasonable capacity. In some of the rooms the clerks are so crowded that they cannot comfortably do their work, and of necessity they very often and very greatly interrupt each other, which seriously retards the business of the Office, and which cannot be remedied in any other way than by furnishing us with additional rooms.

The Examiners have suffered great inconvenience and the public interests great detriment, from the necessity that has existed for several years past of conducting the examination of several classes of subjects in the same room, for instance, steam engines and all cognate subjects under one principal Examiner with his several assistants; and Hydraulics, Pneumatics, and Wearing Apparel, under another with his several assistants, are all crowded into one room. The inconvenience named arises, to a great extent, from the limitation as to space; but in a far greater degree from the diverse character of the inventions under examination, the exposure to the many applicants of inventions that should be kept private; the discussion in the hearing of both the principal Examiners, their several assistants, and of the various attorneys and applicants, of matters which should be known only to the parties in interest, often, doubtless, to the prejudice of justice, and always to the embarrassment of the business of those not engaged in the particular case in controversy.

The draftsmen who prepare the small drawings from which the engravings for the illustrations to accompany the Patent Office reports are made, are greatly in need of more room. Six are now employed, and they are at present located in one of the model saloons, between the model cases, with merely a temporary curtain suspended across from one case to another to shut them out from the view of the many visitors who are daily traversing the saloons. They are thus located because there is no other place to put them, and this difficulty must very soon be increased, as it is absolutely necessary to double the number of the draftsman in order to keep up with the increasing business of the Office.

In the room in which the drawings of inventions are kept, there are about 100,000 sheets of said drawings in a space originally designed for the reception of about 25,000, and the consequent damage resulting to these drawings from the crowded condition in which they are kept in this room, is a matter of very serious consideration.

Should the business of this Office continue to increase, (and it doubtless will do so), it will soon be entirely impossible to take proper care of the drawings unless more room be furnished for that purpose.

The library of this Office has vastly grown in importance within the last few years. It is not only needed and used as an absolute necessity by the Examiners in the performance of their duties, but it is now so much consulted by inventors and those engaged in their interests, by whose money

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the Office has been built up, and who exclusively sustain it, that the want of room and books is now signally felt. It is not an uncommon thing for persons to come from distant parts of the United States to consult books which can only be found here. A careful examination of the catalogues of other libraries shows that the Patent Office collection is now one of the best technical libraries in the world, if not the very best. The high price of gold and the limited means of the Office during the war prevented the purchase of many volumes which are much needed. Gold has very much depreciated and the means of the Office are now ample, and there are needed many volumes of necessary works to complete series heretofore kept up, which must soon be puachased or be hereafter bought at a much greater cost, if they can be procured on any terms, and there is really no room for any additional volumes, if such were now on hand. The works consulted in this library are very many of them of large size and require corresponding space for their examination. It often happens that every table in the room now occupied by the library is more than covered with volumes for examination and this too in places which should not be open to the public at large.

The want of room for the mere deposit of books is so great that many of them are, of necessity, stowed in the halls, in other rooms, and even piled on the floors. This is an every-day inconvenience; add to this the want of room for consulting the volumes as above mentioned, and there will be found a very valuable public institution which is deprived of much of its real means of usefulness for want of proper space for the use of its advantages.

Deeming it to be my duty to call the attention of Congress to the matter of the indispensable necessity that exists for much more room in order to properly carry on the now great and rapidly-increasing business of this Office, I have, as briefly as I could, made the foregoing representations, in the confident hope that your honorable body will, at no very distant day, take measures to afford the relief which is so much needed.

All of which is most respectfully submitted.

(Signed) T. C. TEAKER.
Commissioner of Patents.

Important Astronomical Discovery.

M. Schiaparelli, Director of the Brera Observatory at Milan, has announced the elliptic elements of the orbit of the meteoric shower of last November, in a comparative view with those of the orbits of two late comets—that of 1862 and the first of 1866—pointing out the important coincidence of all their details, to a fraction of a degree in most cases. Thus, the revolution of the comet of 1866 is calculated as 33.18 years, corresponding closely to that of the swarm of shooting stars. Comparing with the great comet of 1862, Schiaparelli gives for the orbits of the shower and the comet respectively the following elements, the co-incidence of which will be found very striking:—longitude of perihelion, 343° 28′ and 344° 41′: longitude of ascending node, 138° 16′ and 137° 27′: inclination of orbit, 64° 3′ and 66° 25′: perihelion distance, 0·9643 and 0·9626: perihelion passage, August 10·75 and 22·9.

Le Verrier ("true to his antecedents," says the Paris correspondent of the *Chemical News*) has done M. Schiaparelli's discovery the honor of adopting it as his own, and reproduced it with some elucidation in a lecture at the Academy of Sciences January 21st. He also addressed a public letter on the subject to Sir John Herschel, which with the reply was published in the *Moniteur*, and all without the least allusion to Schiaparelli, who had published his comparative calculation in the observatory bulletin for Dec. 31st, and a complete mathematical theory of the phenomena in *Les Mondes* of January 25th.

M. Le Verrier is quoted to the effect that the tricennial shower is a swarm of asteroids coming toward us from the depths of space, at regular intervals, and returning toward the superior planets. A body coming from a distance, with great velocity at the moment when it attains the minimum distance of the earth from the sun, could not be fixed in an orbit of one or two years by the feeble action of the inferior planets. This truth finds a physical proof in the fact that the shower of falling stars which repasses the earth every thirty three years is not deranged in the configuration of its orbit, but returns at regular intervals. M. LeVerrier also assumes that the mass of shooting stars could not have been introduced and thrown into its actual orbit but by some energetic disturbance; and remarking that its orbit crosses that of Uranus, concludes that all the phenomena may be explained by the collision of a globular cluster with Uranus at about the year 126 of our era. The latter suggestion meets with doubt, and it is remarked as to the period, that passages quoted by M. Schiaparelli in his article, from the ancient Indian poems, seem to show that the November meteoric shower had been observed long before A. D. 126.

New French Telegraphic Machines.

One of the latest inventions in use, that of M. Neel, consists of a dial on an axis, lettered with the proper alphabet in a circle, moved by clockwork, and stopped at will by means of the electric current. The dial being covered by a screen with a single perforation, each letter is brought to the aperture as it is wanted, and read off at the receiving station. This instrument is so simple and requires so little practice, that it has been adopted in France for railway and postal purposes. A simple form of battery said to be very effective and economical, is in use on French telegraphs. It consists of a rod of zinc forming one pole, in a porous vessel which is enclosed by a carbon cylinder covered with crushed carbon and peroxide of manganese, constituting the other pole. Only one liquid—a solution of chlorhydrate of ammonia in water—is used. The carbon and manganese last a long time and are cheaply renewed. A curious device designed to utilize the whole velocity of the electric current, has been invented by MM. J. Vavin and G. Fribourg. As we gather it from an obscure description in a Paris letter, the system is about the following. The main wire is ramified at each end into eleven short isolated small wires. The elemental parts, eleven in number, of all the letters, are cut out from plate metal and ingeniously arranged (each in connection with one of the small wires) in a group in which any letter may be seen by suppressing the parts foreign to it. The prepared or conductive paper for sending dispatches is stamped with rows of this composite figure, and the letters of the despatch are formed by tracing the proper elements in each successive figure with insulating ink. The machinery at each end of the line (we infer) brings each of the eleven wires into and out of circuit in rapid succession and invariable order, conveying from each part of the traced character on paper at the sending station to the correspondent type in the group at the receiving station, a magnetic action or interruption, as such part is traced or untraced with the insulating ink, and thus automatically printing one letter at each revolution of the series. Another French machine invented by M. Alphonse Joly, "special agent of the administration of telegraphs," prints the despatch at both ends of the line at once, thus verifying, includes among its characters the figures and points, and transmits 120 to 180 letters per minute.

Editorial Summary.

THE number of vessels reported lost during the year 1866, was 554, valued at $13,975,000.

THERE were 2,407,000 of the new five cents coined at the Philadelphia mint in December last.

THE New World still leads the Old in telegraphy. America now has 90,000 miles of telegraph lines; Europe 60,000; India 3,000.

FLATTERY is the oil of the machinery of society. All are susceptible to it; and he that thinks he is not, flatters himself in the outset.

A QUICK PROCESS for getting drying linseed oil is given by Dr. Dullo: boil the raw oil for two hours with binoxide of manganese and hydrochloric acid.

SPAIN AND BRAZIL have abundance of coal, but import the article at heavy cost from England, for want of enterprise to work their own mines. It is believed that a coal field fringes the coast of Brazil from the river Platte to Cape St. Roque.

PUDDLING is performed in a number of English iron works, by an automatic machine driven by steam, closely imitating the movements of the puddling tool as worked by hand, and giving, as claimed, an economy of nearly half in the consumption of coal.

METEORITES—assuming them to be planetary specimens—show by their analysis that peridot, which is found in some of our lowest rocks, is, as Daubree, the investigator of this subject, describes it, the universal scoria, and that oxygen is also a universal element.

LIGHT SUBMARINE CABLES.—An English inventor proposes to give to telegraphic cables a buoyancy which will prevent their parting from strain in paying out, and facilitate raising them, by means of a coating of ground cork mixed with india rubber.

PHOTOGRAPHIC.—The Paris Gas Company has decided to manufacture alkaline sulpho-cyanides and especially the sulpho-cyanide of sodium, on a large scale, at the request of the Photographic Society. The price will be three francs the kilogramme, and sixty tuns can be produced yearly.

A MALLEABLE CAST IRON of great strength, toughness and hardness, is reported to be produced by a secret process by McHaffie, Forsyth & Miller, of Glasgow. It has been used under important contracts for propeller screws, mast tops, hawse pipes, etc., etc. The teeth of pinions cast by this process have been hammered down to the solid boss without cracking.

A HINT FOR THE PATENT OFFICE.—A correspondent complains of the difficulty of finding different models or even classes of models in the Patent Office, and suggests the improvement of having the localities of the several classes marked by conspicuous signs, and the subject, date and grantee of each patent stated in a neat and plain inscription over the model.

PUTTING OUT A FIRE.—During the process of extinguishing the fire in the colliery of Clackmannan, near Stirling, England, in 1851, about 8,000,000 cubic feet of carbonic acid gas were required to fill the mine, and a continuous stream of impure carbonic acid was kept up night and day for about three weeks. The mine extended over a surface of twenty-six acres, and had been thirty years on fire.

THE SILK COLLODION newly invented, has long been obtained, or something like it, by the Chinese, from the contents of the silk worm which has been prevented from spinning. The matter is found in a thickened mass or gum, and is made into a transparent varnish. It is also spun (as the gum is said to have been spun lately by a Frenchman in a still earlier stage of its formation in the mulberry tree) and forms a very strong thread, used for fishing lines and snells.

IMPROVEMENT IN WATCHES.—An English manufacturer has invented an arrangement of watch movements by which the full-sized balance wheel of the English whole-plate watch is carried in the thin flat case so much preferred for convenience, but hitherto excluding the perfection of structure and durability. A Mr. Barlow has patented a simple contrivance by which the only figures of the dial that appear are those of the current hour and minute. A perforated screen is made to revolve instead of hands over the dial.

PATENTS AND PROSPERITY.—The *Scientific Review* (London), commenting on the remarkable exhibit of our Patent Office, makes a suggestion to the effect that the relative commercial prosperity of different countries seems to bear an intimate relation to the encouragement and activity of invention, as indicated by the spirit of their patent laws and the number of patents granted. Witness England, France and America, progressive in laws and arts, in contrast with Switzerland, China and Japan, wedded to the ways of a younger and cruder age, as if the man should look back to boyhood for his model, and glory still to think, to speak, to act as a child.

SOUND AND COLOR VIBRATIONS.—It is calculated that the deepest note which the human ear perceives as a continuous sound, is produced by 16 vibrations in a second: the acutest by 48,000. The extremes of color are red and violet; the former given by 458 billions of vibrations per second, and the latter by 727 billions. The relative velocities of light and sound, and the relative refinement of the media through which their effects are conveyed, are illustrated by this comparison.

MOUNTAIN ATTRACTION.—The pendulum experiments connected with the great trigonometrical survey in India, have shown that, contrary to previous theory, gravitation is less powerful as we approach the Himalaya mountains; corroborating the Astronomer Royal's opinion that the strata below the mountains are less dense than those beneath the depressed portions of the surface. Nothing could be more probable, than that the upheaved portions of the crust should be the weakest.

THE PONTOON RAILROAD BRIDGE over the Rhine, or that part which rests on pontoons, is 768 feet long. The connecting ends of the shore approaches are adjusted to the rise and fall of the pontoons by a screw gear. The pontoons are coupled in sets of two or three, and each set can be readily removed for the passage of vessels and replaced. They are 65½ feet long, and sustain a roadway of about 40 feet in width, the central portion occupied by the rails, and the space on each side devoted to ordinary traffic. It has been in use about twenty months. The sinking of each pontoon under the locomotive is said to be only one-third of an inch.

ELECTRICITY AND ALTITUDE.—M. Matteucci has found that if the surface of the earth at different altitudes be connected by a conductor, a constant current of electricity will flow from the lower to the higher point; the intensity of the current increasing with the difference of the altitudes. Thus, between Florence and Turin, the deflection of the galvanometer from the current passing through it was from 15 to 20 degrees; between Pontedera and Volterra, from 20 to 25; and between Aoste and Courmayeur, from 40 to 50. Atmospheric changes, however, modify of course the effects, as do also diversities of latitude and geological formation. The aurora borealis and the variations of terrestrial magnetism are supposed to have an intimate relation with this distribution of electrical conditions.

A MONSTER SAW.—At No. 2 Jacob street, this city, we saw, a few days ago, a circular saw intended for the Paris Exhibition, which is said to be the largest ever manufactured. It is 88 inches, or eight feet four inches, in diameter, of one solid plate, from the works of Messrs. W. Jessop & Sons, England, and weighed, before finishing, 590 pounds. The saw is one of Emerson's patent, having movable teeth which are secured in the plate by V-shaped grooves with corresponding tenons and one rivet to each tooth. The thickness of the finished saw at the center is No. 2, Stubbs' wire gage, and at the edge, No. 5. The saw was made by the American Saw Company at their works at Trenton, N. J. It will be a prominent feature of American industry at the Paris Exposition.

A VALUABLE FIRE ESCAPE has been introduced in England in a form convenient for travelers, and as safe and easy to use as a flight of stairs. Within a thin metallic case only 7½ inches in diameter, are coiled on a pulley thirty feet of light, strong and flexible steel-wire rope or tape, passing out between rollers adjusted by a hand screw to any desired pressure, and terminating in a hook for fastening to a window seat. A chair for the body, formed of leather straps, is attached to the case, and the hook being secured to the window seat, the person seated in the chair may regulate or arrest at pleasure his own descent, by means of the screw. By using fine steel wire, woven into a tape, sixty feet might be coiled in a smaller case than that above described, making a perfect fire escape portable in every one's carpet bag.

DOMESTIC ECONOMISTS may try the suggestion of covering the bottom of a fire grate with a plate of boiler iron or the like. Dr. Samuel Warren (author of "Ten Thousand a Year," and now recorder of Hull) asserts from experience that by this means one third of the coal may be saved with an increase of warmth. The iron plate evidently acts as a reservoir and radiator of the heat in the downward direction where it is most useful, and strengthens the combustion above it. The layer of ashes which usually receives the downward heat, absorbs it with avidity and scarcely radiates it perceptibly: as is proved by the fact that a grate is quickly burned out by an accumulation of ashes under and in contact with it, which without contact would be quite harmless. The capacity of ashes for "keeping" fire (*i.e.* heat) also proves that it should never be avoidably left in a position to absorb the heat, where active radiation is wanted. A fire clogged with ashes gives out, for this reason, palpably less warming effect than a clean fire, for the same amount of fuel. If the plated grate above suggested be not kept clear of ashes, the heat in the ashes will be largely withdrawn into the plate by contact, and thus utilized; but the plate or grate, whichever is uppermost, will be rapidly burnt out. The best economy of both heat and apparatus, is to keep the plated grate clear, and probably a further saving would be effected by allowing the hot ashes to be distributed upon a lower plate freely exposed to the atmosphere of the room and frequently cleared.

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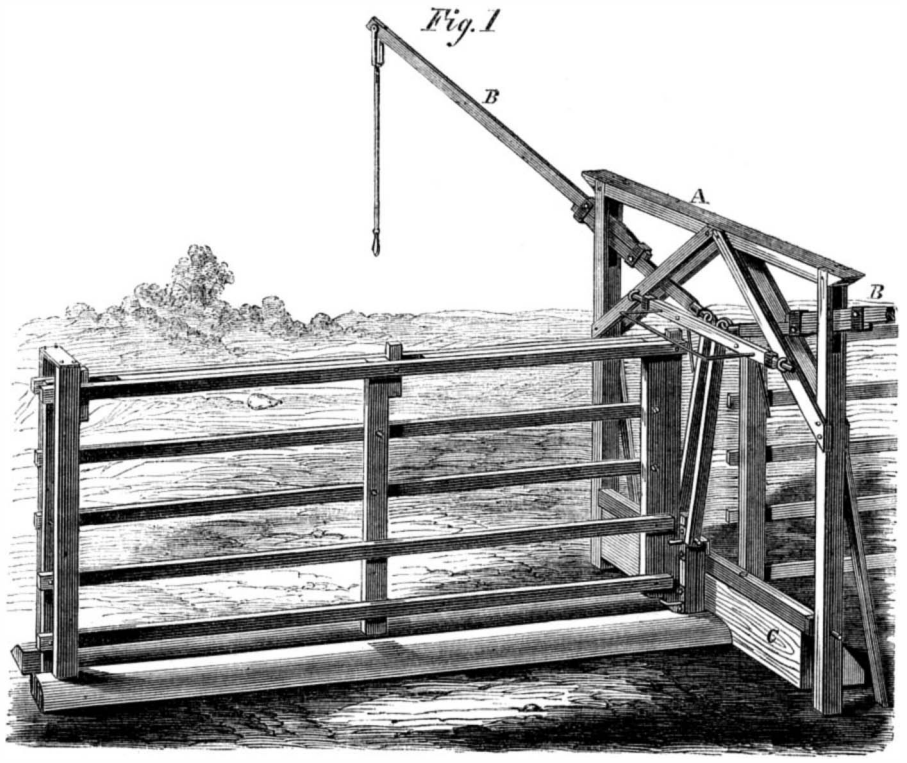
Improved Lever Farm Gate.

The gate seen in two positions in the engravings is one which when closed forms a portion of the fence as rigid and secure as the fixed fence itself. When opened it is entirely out of the way, so that the space occupied by the gate is left free. It is a pivot gate, the horizontal and upright bars being so pivoted at their intersection that by the action of a lever the gate may be folded together and dropped into a channel prepared for it.

A properly braced frame, A, supports two levers, B, one on each side of the gate, which engage at their inner ends with two upright bars pivoted at the lower ends with the gate post. Connected with these upright bars and turning on suitable pivots with them, is a horizontal box, C, weighted with stone to counterbalance the gate. Opposite the gate frame is an upright to hold the gate in position when closed. A horizontal bar on the main frame, acting as a latch, is operated by the levers to unfasten the gate, and when the gate is closed falls by its own weight into position and holds the gate securely. There are no posts or parts below the surface of the ground to be rotted off; no pit to give space for the action of weights, and to be filled up with ice in winter. All its parts are above ground, the gate when closed occupying a space no deeper than sufficient to hold the horizontal bars of the gate when they are folded together. The driver of a vehicle, or the equestrian, may, without alighting or relinquishing the reins or bridle, open and close the gate by the pendent rod at the end of the levers. If the channel should become filled with snow or ice, the gate can be easily removed by withdrawing a pin near the bottom and the channel be left clear to be cleaned. The attachments for working the gate appear to be of the simplest construction, not liable to become disarranged, and built for durability.

This gate was patented Jan. 29, 1867, through the Scientific American Patent Agency, by George McKnight, of Hebron, N. Y., whom address for further information.

Fig. 1



McKNIGHT'S LEVER FARM GATE.

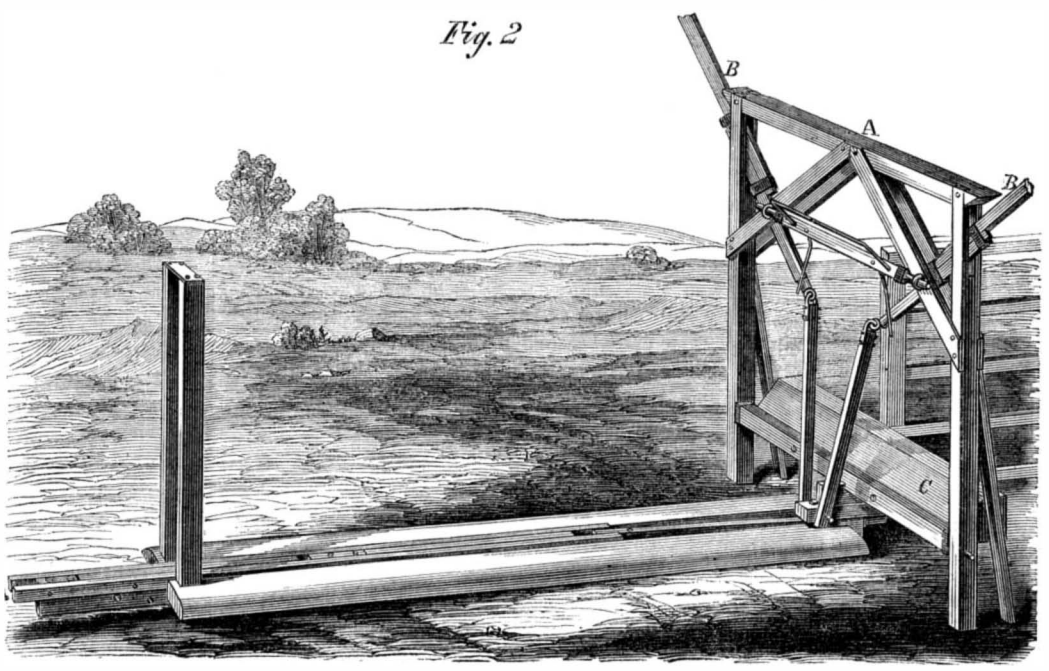
MANUFACTURE OF FOREIGN BEER.

English men, women, and children, commencing with the new-born babe who imbibes it in its mother's milk, drink on an average a barrel of beer each per annum, during life. They did so a hundred and fifty years ago when there were but six millions of them, and they do it now when they are twenty millions. Consequently the brewers of England have the task of producing annually among them 20,000,000 barrels of beer for home consumption, beside the immense export. It is therefore no wonder, or rather only the same wonder over again, that each of the twelve great breweries in London, among which it is difficult to say which is the greatest, occupies many acres of ground, employs men by hundreds and horses by hundreds, and stores its current product by the hundred thousand barrels. But at Burton-on-Trent, a large section of which is devoted to brewing, and presents to a bird's eye view the appearance of one vast brewery, space and facilities for the manufacture are more abundant than in London. The premises of one brewing firm (Bass, Ratcliffe, Grattan & Co.), cover 48 acres, eight of which are sometimes covered with beer three casks deep, worth some two and a half millions of dollars, waiting to be distributed to their customers and agencies. Their sales amount in one season to six and a quarter millions of dollars ($6,125,015); their malt tax to Government, $885,731; their workmen, 1,555, and clerks, 163. They reap (indirectly) 30,000 acres of land yearly of its crop of barley, yielding 1,280,000 bushels of malt. They consume 130 tuns of coal per day, and 8,000,000 cubic feet of gas per annum. And their business is extending at the rate of 200,000 bushels of malt per annum.

The operations of another firm at this place (Samuel Allsopp & Sons) are scarcely less extensive. Both the names mentioned will be recognized as leading and celebrated brands the world over. The brewery of Allsopp & Sons is said to be probably the most perfect and complete establishment ever erected. Their premises cover fifty-two acres. Their counting house is a hundred and twenty feet square, subdivided by glass partitions, and handsomely furnished, with every department thoroughly systemized, including even a post office, and a department of chemists, whose duty it is to subject the beer to known tests at every stage of manufacture in order to secure its ultimate perfection. Duplicates of every utensil employed in the manufacture are kept on hand, so that no time may be lost by accidents. Every one of their 400,000 casks (which they make for themselves) has its number and its account kept, so that its present whereabouts and past history can be told in a moment.

In the establishment of Barclay, Perkins & Co., in London, —another household word all over the world—the larger storing vats contain 5,000 barrels each. Their stables contain 120 horses weighing from 1,700 to 1,900 pounds each. The malt houses are situated in the country; yet the city establishment covers twelve crowded acres. They bring up their sons to the business—five of them at present—by an apprenticeship of four years, during which they live on the premises in a building erected specially for them, rise at four o'clock in the morning or earlier as circumstances require, and upon occasion take the places of any of the clerks who may be sick or on leave, so as to become familiarized with every detail. Everything, and especially every moment of time, is economized and appropriated with rigorous system.

Fig. 2



A peculiarity of the London beer business is that the brewers to a large extent own or control the alehouses, and the retailers are their tenants, dealing only in the article manufactured by them or in non-competing articles. A large sign displays the brand—"Barclay, Perkins & Co.'s *Entire*," for example. The price per barrel is about $7 33 for ordinary porter, and for ale $7 78. The retail price is 1½d. (say 2¾ cents) per glass, a full half pint, or 4d. (7$\frac{4}{10}$ cents) per quart.

The taxes are laid on the malt, except a trifling license duty of three pence a barrel on beer, substituted in 1862 for the duty on hops. The excise duty on malt is 2s. 8½d. per bushel yielding half an English barrel (about 22 American gallons) of beer, making the whole duty equivalent to 94 cents on an American barrel; which rate it has not exceeded for the last 44 years, except in 1854 and 1855. Nearly one-tenth the expenditure of the British Government is paid by beer; but a much larger proportion is borne by (British) spirits. Together, the liquors pay nearly one-fourth the whole cost of the general government.

It is a noticeable fact in the experience of British taxation, that while no increase that has ever been made in the rate of taxation on spirits has, in the long run if at all, reduced the consumption, the taxation of malt liquors has been sufficient at some points to diminish the demand very seriously. This result illustrates very strongly a fact by which it is undoubtedly explained: *i. e.*, that no such unconquerable passion is excited for beer as for ardent spirits, and hence the former will be dispensed with when it becomes too expensive, while no sacrifice is too great for the devotee of ardent spirits to make to his idol. Congress should bear these plain facts in mind, and keep a tax on ardent spirits simply as high as it can be made practicable to collect.

It is said that almost every householder in good circumstances keeps a barrel of malt liquor on draft in his cellar. The average Englishman, drinking as we said his average barrel of beer per annum from birth to death, drinks less than three quarts (·645 gallon) of spirits per annum. In Ireland and Scotland, the principle though not the exact proportion is reversed: owing, some suppose, to a heavy excise imposed upon Scotland by the English in 1707, which suppressed the consumption of beer and brought whiskey into its room. In Ireland, the manufacture of porter was introduced only at the dawn of the present century. Consequently the brewing interest is insignificant in those parts of the United Kingdom, comparatively, and yet it is not so to our conception of things. For instance, the celebrated porter brewery of Guinness, Son & Co., Dublin, which has given a leading brand to the cosmopolitan market, is reckoned by the proprietors to rank about the fourth in extent of production in Great Britain. The wealth as well as the liberality of the concern may be inferred from the fact that its senior gave at one time $726,000 for the renovation and enlargement of the Protestant Episcopal Cathedral in Dublin. The still larger gift of his son, Rev. Henry Grattan Guinness, who gave himself as a gratuitous evangelist throughout the English-speaking world, is fresh in the memory of every one in this country.

In Scotland, the brewers are famed for a superior quality of ale, of great gravity and strength. "Scotch Ale" is a department of the trade in both hemispheres. The Scotch brewers are also successfully meeting the increasing demand for a lighter ale, competing in their own market and to some extent even in the English, with the famous breweries of Burton-on-Trent. Yet the whole production of malt liquor in Scotland and Ireland together is but one tenth of that of the United Kingdom. That of London is about one sixth of the whole.

In regard to peculiarities of manufacture, a few items may be added. The prejudice against American hops is rapidly disappearing: a portion of them are now used in nearly all the large breweries. The superiority of British beer is due in great part to the extreme care taken by the brewers in the selection of their barley and the manufacture of malt. They pass it through screens and fans, separating the lighter grains as food for cattle and using only the best grain for malt. Ample time is given the barley on the floors, to germinate, and the drying is very careful and perfect. It passes over a screen when thrown from the kilns, and the separation of the rootlets is thus more thoroughly effected while warm and crisp than afterward. Immediately after this, it is placed in bins and covered four inches deep with the rootlets to protect it from moisture. The malt floors are tiled with what are called ferro-metallic squares.

The heavy Scotch ale is manufactured, in some breweries at least, only in fall, winter and spring, when it can be fermented at a low temperature. The famed clearness of the Burton ale is attributed to the calcareous composition of the water used. The manufacture of porter and ale, in Barclay, Perkins & Co.'s establishment, are as distinct processes as if there were two distinct breweries. The mash tuns are commonly of iron, but in Allsopp's new establishment the receptacles and utensils for mashing, fermenting and finishing their beer are of wood; and at another celebrated brewery, that of Truman, Hanbury, Buxton & Co., many of these vessels are beginning to be made of slate, which gives high satisfaction on account of its cleanliness and durability.

The above data are mainly derived from the report of the Commission of the American Brewers, sent over in 1865 to obtain accurate information of the excise laws of Europe relative to malt liquors, to be presented to the United States Internal Revenue Commission.

GERMAN BEER.—Beer, as we have seen, is a great thing in Britain, but in the Saxon mother country (or as we Americans should call it, grandfather land), it is a sort of all-in-all. Its consumption is largely increasing in all the German and kindred countries, notwithstanding the competition of the cheap indigenous wines. In Bavaria, famous for beer, the incredible statement is made by the Brewers' Commission that the consumption is a hundred-fold greater than it was twenty years ago. We are tempted to assume that they meant to say a hundred per cent instead of a hundred fold. Up to 1811 the business of brewing was an aristocratic privilege, confined to the nobility and clergy—the latter being allowed to brew for their own use. In 1785 this monopoly had been relaxed so far as to allow the people to brew for their own use, but not to sell beer. Now, the government puts forth its power to protect and stimulate the manufacture, and provides the people with beer almost untaxed, and even at cost, with its own royal hands. A rise in beer is dangerous, like a rise in bread in Paris of old. A riot resulted in 1847 from an advance of 1$\frac{1}{4}$ cents per quart on account of a partial failure in the barley harvest. The King's Brewery, at Munich, under

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the control and management of the Government, furnishes to the people without profit a light beer at four cents per maas containing a little over a quart. So great and vital a public interest is the supply of cheap beer! The monks of St. Francis, in the same city, still have their brewery, in admirable order, and famed for the excellence of its beer. A workman's allowance of beer, at least in the breweries, is seven quarts per day. We can easily believe that there is no room for intoxication. The manufacture is superintended at certain points by government officers, not only for revenue purposes, but also to secure the standard quality. A brewer's claim upon a retailer for beer sold, has precedence of all others, at law. In Vienna, the consumption of beer is nearly 2½ barrels a year per head of the whole population. In a city of Saxony called Crimmitzschau, the success and prosperity of the beer brewing is regularly and publicly prayed for in the Lutheran churches.

The system of brewing in favor throughout most of the German states is that of Bavaria. One of the peculiarities gives the well-known general name *lager* (cellar) to the German beverage. It is cooled and kept in vast cellars, sometimes 40 feet deep, and filled in with ice. This is indispensable to the preservation of the "low-hopped" beer in favor with Germans. As much as 10,000 tuns of ice are thus used at once in a single establishment. The malting of the barley is also conducted in cellars, the floors of which are composed of smoothly-worn blocks of stone. The malt is dried on kilns of perforated iron plates, one above another; the germinating barley being permitted to wither somewhat before being placed on the kilns, and being let down from upper to lower kilns all through the series, as it proceeds in drying, which is accomplished in twenty-four hours. This rapid drying is preferred to the slower process used in other countries. The fermentation is downward, instead of upward as in England. In Austria, Prussia, Saxony, Wurtemberg, Baden, and other states, as well as Bavaria, a similar system of brewing is general, and the quality of the "lager" is considered excellent. It is lightly taxed and zealously encouraged by Government. The tax is generally little over 30 cents per American barrel.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

What Proof is there in Science that the Earth was once in a Molten or Fluid State?

MESSRS. EDITORS:—Our acquaintance with the present known laws of nature, compels us to believe that, instead of the earth having been once in a molten state, it was nothing more nor less than a fluid body of water, holding in solution at that time all the materials which were to form its future solids; and, that its internal heat was first generated by chemical and electrical action; also, that the same laws are still in operation, viz., new compounds are continually forming in the bowels of the earth, while old ones are being decomposed. These things we will endeavor to explain by the following facts and deductions, viz.:—

1. Granite, as a solid, contains in its composition, almost all the ingredients which form the other rocks. And it is not even probable that a complex mineral like granite, was the first solid rock which was formed on the earth. Because chemical experience proves conclusively, that simple compounds are always first in the order of nature, and then these simple combine with other simple compounds to form complex ones. Therefore, it is a question in science whether granite was the first species of rock formations, as we cannot tell whether the other rocks were subsequently formed from granite, or whether granite was formed by fusion from the various other rocks. One thing is certain, however, viz., that water, in connection with heat and pressure, has been, and still is, the principal cause of the formation of rocks; and which is a positive proof that water must have existed before the rocks were formed.

2. The petrifactions of wood and other substances, the formation of coal, the deposits in steam boilers, etc., and the beautiful stalactite ornaments of nature found in caves, are evidences that water, even now, contains in solution the materials which produce such effects. Therefore, a correct knowledge of the various operations of water in nature, is the true key to her chemical laboratory.

3. The solution of rocks is fully established by chemical experiments. This discovery, long known to chemists, proves beyond a doubt, that quartz and flint were originally in a fluid state. And this is strong evidence of the original fluidity of the earth, and of the very slow process of the formation of its solid portions.

4. The earth, as a solid or liquid mass, could not exist in an incandescent state; because such an intense heat would decompose it. Such a theory is, therefore, contrary to the known laws of philosophy and chemistry.

5. If the theories of those who maintain the opinion that the earth was once a molten mass be true, then we should have evidence of such a fact in the earth's contraction by cooling, as it would diminish in size; by which means there would be a perceptible change in the time of its diurnal and annual motions. For its orbit must be contracted likewise, or it will have to make more diurnal revolutions to complete the circuit of the year in the same time. But such is not the case even to the sixtieth part of a minute, as demonstrated by the calculations of eclipses and transits.

6. Iron, steel, gold, silver, copper, brass, tin, lead, zinc, etc., are soluble in acids. The alkalies also perform the same office to the minerals, and the materials which compose these acids and alkalies are found in the earth.

7. The solubility of these metals and minerals then, is only the reduction of them to their original state, before the solids of the earth were formed. The electrotype process is likewise a positive proof of the deposition of metals from fluids. Such facts then, are strictly in accordance with the principles we adopt in relation to the original fluidity of the earth.

8. The human body is a fine specimen of the laws of internal heat in the bowels of the earth, as the blood, in order to preserve health and life, is kept up to a uniform standard of temperature in all climes. Here, then, is a beautiful law, which performs its functions in the temperate, the torrid, and frigid zones. And why may not the internal heat of the earth be governed by a similar one? Chemical action is going on continually in the earth, as well as in the human frame, and its identity is preserved in a similar manner.

9. It is a rule in chemistry that when liquids become solids, heat is given out, and when solids become liquids, that heat is absorbed.

10. When, therefore, the solids of the earth began to be formed by crystallization, a chemical and an electrical action commenced, and heat was produced. These laws are continually acting and reacting upon each other, even in the present day. And where the action is greatest, there will be earthquakes, volcanic eruptions, and a gradual rise of continents. And this internal chemical heat, when at its maximum, must have a greater or less influence on climate. It is not confined to any particular locality, but manifests itself wherever the necessary materials for its chemical action are found. The internal heat of the earth then, is a chemical effect.

JAMES QUARTERMAN.

New York City, Feb. 14, 1867.

How to Clear Vessels of Water.

MESSRS. EDITORS:—As a public benefit, I wish to give your readers a description of two devices that are successfully used on the western rivers, for clearing the hulls of steamboats and other vessels of water, without manual labor in pumping.

1st. If the vessel is a steamboat, lay a two-inch gas pipe with one end resting on her bottom planking, in the lowest part of the hull—which is usually right under the boilers—and the other end projecting through the hull as close to the water line as will be safe.

Then lead from any part of the steam pipes or reservoirs, another pipe about half an inch in diameter, furnished with a stop cock, and insert its open, but slightly contracted end just into the end of the large pipe that rests on the floor. Whenever this end is below, or partially below water, by turning on steam through the small pipe the water will be ejected overboard with surprising rapidity, and the vessel can usually be kept clear by using steam only, when it would be otherwise wasted by blowing off. Of course the principle is the same as that of the Geffard Injector and the steam pump.

For a portable pump for clearing vessels along side, (as barges attached to steam tugs) the large pipe may be laid down, simply resting one end on the bottom and the other overboard, and the steam be injected through a rubber hose with a properly shaped nozzle.

The second device for clearing vessels of water can only be used in those of light draft, and when under way at a speed proportioned to the draft.

It consists in *boring a hole through the bottom of the vessel to et the water run out.* But in order to make the water run out instead of in, a tube made of sheet metal, and shaped something like a sugar scoop at one end, must be inserted in the hole, and project through the planking a few inches, with the open side of the scoop-shaped end turned aftwards, so that the vessel by its motion in the water produces a vacuum behind the tube, and the water in the hull will rush in to fill it. In this way a vessel going six miles an hour with the water in the hull not more than two feet below the surface outside, can be emptied faster than if it were on dry land and a hole of the same size bored in its bottom. This arrangement might also be permanently attached to any vessel, stopping up the hole with a plug whenever dry, or when not under way. It will most certainly work under the above conditions, and has been often tried on the Mississippi. I have known a steamboat to start out from her landing and take a circle around and back again, to clear her barges by this method, and prevent their sinking. C. B.

Testing of Steel During the Proces of Manfuactures.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of the 24th of Feb. you say that there is difficulty in ascertaining the quality of the ingots made of the crude molten iron by the pneumatic process, and suggest a mode to ascertain the different grades and quality of the ingots for the purposes intended before rolling or forging. But the mode you suggest is much too tedious and expensive for practical purposes. There is no difficulty in detecting the two grades—high and low—of the manufactured ingots by the pneumatic process under the Shunk patent, before the operation of rolling or forging is commenced. The quality of each ingot is readily detected by a small fracture or corner of the metal broken off for examination. The same mode is practiced to detect the different quality of the ingots made by the "pot process" for the manufacture of fine tool steel, and which is always necessary to be done before the ingots are forged into the kind of article desired. A skilled workman who has gained sufficient skill in the pneumatic process will, at the first glance of the eye, see the quality of the ingot by the fracture of the metal, whether it is high or low steel. Hussey, Wells & Co., of Pittsburg, who make one thousand ingots of fifty pounds each daily by the "pot process" for fine-tool steel, test every ingot before forging, in the mode above suggested, and the whole operation does not require more than a minute of time to each ingot. The low or semi-steel is always selected for the manufacture of the T-rail bar, locomotive tire, car axles, boiler plate, and armor plate, and is now being used for wagon and buggy tire, and also in the manufacture of machinery, the cost of the manufacture being about the same as bar iron. The harder kinds of ingots—those that contain the greatest amount of carbon—are selected for other purposes, such as plow plates, spring steel, hammer steel, and all the ordinary uses for smith work.

The semi-steel rail bar, made by the pneumatic process, is perfectly homogeneous and free from the flaws and defects, so common in the iron T-rail which is manufactured from the cheapest and lowest grade of metal, and is always destitute of fiber in the fracture of the bar, and much more liable to break in frosty weather than the steel rail. The semi-steel T-rail made by my pneumatic process possesses ductility and tensile strength five times greater than the iron T-rail in use. The steel rail contracts much less in cold weather than iron, owing to the perfect refinement and purity of the metal effected during its conversion by the air-blast process, and is therefore less liable to break in frosty weather than the iron rail so much inferior in quality. C. SHUNK.

Looking Two Ways for Monday.

MESSRS. EDITORS:—I have often heard of people looking two ways for Sunday, but never before I saw your article in your last number, of their looking two ways for Monday. Now, dear Messrs. Editors, unless you are quizzing your one hundred thousand readers, allow me to correct so grave an error as you have fallen into concerning the length of Monday. For wise reasons, that dates might not be confused, the day everywhere begins at 12 o'clock midnight, when people are or ought to be in bed and the business for the day closed. Allow me to illustrate. Suppose you telegraph your friend in London this Monday evening at 9 o'clock, and he receives the message in one hour, it will be 2 A. M. on Tuesday, allowing five hours difference of time (which it is nearly), and he may answer your note, which you will receive at 11 P. M. on Monday. If your friend was at the antipodes and had a line that would carry a message in about one minute he might ask you at 1 o'clock A. M. on Monday morning, "What's the news in New York to-day?" and you would have to answer, "Oh, no news to-day: I am just sitting down to my Sunday dinner at 1 P. M. Good by. All well."

Now, Messrs. Editors, allow me to ask a question. A vessel sails from New York in the morning, counting every day, and when the captain arrives in China he finds himself a day behind time. How is it when he comes back? Ahead or behind? Or if a man start from New York on Monday at 12 midnight and goes west around the world in 23 hours, he keeps ahead of Tuesday. If he goes east where does he meet Tuesday and how does he get back to Monday?

A. HOPKINS.

[Our correspondent needs to put on his thinking cap. The day is only twenty-four hours long at any given place (meridian of longitude): we have not suggested otherwise. East of the day line, the reckoning is all the time one day in advance of the west. Just as soon as you cross the day line, whether going east or west, you come into a new day. When you cross the day line going east you gain a day, and when you return you lose it. If you start at 12 P. M. Sunday, going west at the rate of "around the world in 23 hours," you immediately get back into Saturday. You will find Sunday when you reach the day line, and you will have no Tuesday until you get to the day line for the second time. If you start at 12 P. M. Sunday, going east at the same rate, you will not find any Tuesday until you reach the day line for the third time.—EDS.

Explosion of Boilers--A New and Simple Preventive.

MESSRS. EDITORS:—Noticing in one of your recent numbers an article on boiler explosions, and thinking the subject rather badly handled, I conclude to give, through your very valuable paper, a few hints of my own on that much misunderstood subject. I think, likewise, I have originated and adopted an efficient remedy for most of the difficulty. But of that anon. In an experience of about eighteen years, and with pretty close observation of causes and effects, I think I have demonstrated that boiler explosions result from two common, plain and simple causes, and if there is any mystery about the matter with me, it is that explosions are not many times more numerous. The first of these causes is simply the severe tests boilers are a subjected to daily and hourly in ordinary usage, not intentionally, but from want of knowledge of causes and effects. To explain: it is and always has been a common practice in feeding or supplying boilers to discharge the feed pipe into the under side of the after end of the boiler, or into a receiving drum, which discharges in the same place. This feed water, though always intended to be comparatively hot, is not always so: on the contrary, it is sometimes tolerably cold. Now all boilers under a pressure of steam are fully expanded, and as a matter of course, if supply or feed water is discharged comparatively cold, as it is usually, on the bottom shell of the boiler, it must produce a sudden contraction of the part so cooled, and if the iron is not very soft and tough the sheet will tear apart, sometimes in the middle, sometimes in thee lap between rivets. This I have known very many times to the extent of ten to fifteen inches. This you will see is a good start for an explosion, provided, of course, the boiler is carrying a fair working pressure of steam, and as is almost always the case, the iron in two thirds of the circumference of the shell is no better than that already broken.

The second great cause is the carbonized, hardened, brittle condition of that portion of the shells of boilers exposed to a very intense heat, and this heat, as is usually the case, generated with coal more or less impregnated with suiphur. Under these circumstances boilers in use from six months to two years always become more or less carbonized or hardened

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and brittle, and will not stand the test of sudden contraction by cooling parts, as above described. It sometimes happens that iron in new boilers, or parts of them, is more or less hard and brittle, and of course in a measure liable to the same misfortune under the same circumstances as before described Now when we add to the other two causes, and in combination with them, the carrying by engineers of all the pressure allowed by law, and sometimes a good deal more, it is certainly not strange that explosions so frequently occur, for we have here all the causes in combination to produce that effect, and the wonder, as I before stated, is that explosions are not many times more frequent. I am satisfied, however, that very many explosions have occurred with only an ordinary working pressure, and mainly from the first two causes, namely. sudden contraction of parts of the shell, and the hard and brittle condition of the iron.

I promised a remedy, and here it is. Some year and a half since I was repairing a boiler that had been blown up by the explosion of another alongside of it. We found the iron so hard and brittle that we could not punch or bend without breaking it. Finding it impossible to do anything with it in that state, and knowing I could not make it any worse, I suggested to Mr. Webb, my foreman, the idea of annealing it, which he did, and with the most signal success: nothing less than completely restoring the iron to a uniform soft and tough state, and I think better than it ever was before. Since that time I have annealed all the boilers I have used, with the same success. This annealing process is simple, cheap and safe, loosening not one seam or rivet, and consists merely of draining boiler dry when in the furnace, then firing up with dry wood until the boilers are barely red hot, then cooling as gradually as possible, and the thing is accomplished. In conclusion I will say that all new boilers, no matter how good the iron, should be annealed. It will in any case give to all the plates a uniform toughness and temper. I will say further, that with careful superheating of feed water before it can touch the shell of the boiler inside, and with the annealing process, which should be repeated every six months, boiler explosions will be things of the past. This sudden contraction of parts of boilers is caused sometimes by cold water, or cold blasts of air coming in contact with the outside shell, with more or less the same effect. Of course care should be taken to keep water well over the flues, to prevent them from heating and collapsing. And now, hoping you will speedily give this nut to your numerous readers—among whom are the *savans* of the age—to crack, as well as for those using boilers to profit more or less by, I am very respectfully yours,

Beardstown, Ill. C. S. Ebaugh.

Why Ice Is Slippery.

Messrs. Editors:—I do not agree with your answer to your correspondent A. D. C., Mass., in No. 7, present volume of the Scientific American. I believe that "why ice is slippery" can be explained scientifically, or at least is worth inquiring into. First, Is ice slippery at all? I believe that should be the question. Now my theory, right or wrong, is that ice is slippery only by coming in contact with certain things and not with others. For instance, ice is exceedingly so when in contact with iron or steel especially if polished, less so with wood, less so again with india-rubber, leather etc., and not at all with straw. Now why do these materials have a different action on ice? I think that we must look for an answer into the different properties of each of these things.

For instance, iron is a good conductor of heat, wood is not, and so on of all things, in various degrees. Therefore all which are good conductors will, in coming in contact with ice make it slippery, and others will not. Take the blade of a knife and lay it on a piece of ice; it will sink into it. Take a piece of wood of the same size as the blade, and add to it a weight, to give it the same specific gravity, and it will take more than double the time to sink as deep, if it sinks at all. Why is this? Simply because the steel receives from the surrounding atmosphere a certain amount of heat which it conveys directly to the ice and melts it; while wood does not, or at least takes a longer time in doing so. But you will ask, what has all this to with our subject? Why, Mr. Editor, according to my theory it does this. (By way of illustration.) Start on ice with a pair of skates. The runners at once melt the ice, in a slight degree it is true, but yet it melts. Melted ice is water, a very small quantity no doubt, but quite sufficient to act between the runners and the ice, as lubricating oil does in machinery.

No doubt you have heard of a system of railway actually working in France, not far from Paris. It is an experiment by a certain ex-general, I believe, and consists, as far as I can remember, in letting a sheet of water run between the rails and the runners of the locomotive, so as to neutralize the friction. If so, then you have iron made slippery, and yet iron is not slippery of itself. P. Jeanne.

Brooklyn, N. Y.

[Our correspondent's criticism is hardly fair. Our answer had in view that slipperiness which is an ultimate property. The practical improvement of the property by the use of a lubricator, water or oil, or by any other device, is quite another matter.—Eds.

The Tempering of Steel Tools.

Messrs Editors:—In your issue of Feb. 16th, I notice an article from correspondent "V." in which he gives the manner of tempering steel tools for various purposes, stating the color that the surface of the steel assumes. Now I think his rule will not hold good in all cases, as I find that the coloring depends altogether upon the amount of polish given to the steel after it is hardened. So far as my experience goes, I find that the higher the polish the higher the color should be left.

For instance, take a piece of steel and harden it, then give it a bright polish, and for a wood-cutting tool, it only requires drawing to a pale straw-yellow, while the other side which is not polished at all, will be deep blue. I think that there can be no definite rule given for all to go by, unless we can have a standard rule for the polish to be given to the hardened surface. Such a rule I think is impossible, and the best way is for each steel worker to go by his own experience. It is a fact among steel workers that when one goes into another's shop and sees the color that he leaves his tools, when he tries to imitate the other, his tools will not stand although he may give them the same shade of color. The reason is, I think, one gives the tool a higher polish than the other. If any of your correspondents can give a standard rule to polish by, so that every worker can give the same polish, I should like to hear from them and so would others.

Kingfield, Me. W. L. Dolbier

The "Algonquin" and "Winooski."

Messrs. Editors:—Your correspondent "S. H. W." in the Feb. 23d, issue of the Scientific American, in alluding to the trials of the *Algonquin* and *Winooski*, calls to mind an important fact in favor of the *Algonquin*, which, if noticed in any report or controversy upon the subject, a constant reader of your paper has never seen. As it was not the point in question it was probably neglected rather than overlooked. The fact alluded to is that the *Algonquin* used very much less steam than the *Winooski*, showing that, as the fuel used in each did not greatly differ, the generating power or capacity of the boilers of the *Algonquin* was economically deficient. The general tenor of discussion and comment in the papers would impress the public mind that neither possessed much advantage over the other and the object of this communication is to draw attention to the economy of steam in the *Algonquin* due to the expansive principle adopted therein. Writing from recollection, the quantity used was about one-third less than in the *Winooski*. E. M. Chaffee.

Providence, R. I.

A Dead Hand.

One of our western exchanges contained, a short time ago, the details of a singular case of paralysis or something similar. It seems that a young man, by way of exhibiting his muscular power, struck his fist through a heavy panneled door, and from that time forward the hand has been numb. The account says:—

"In a few weeks the hand began to wither and the fingers to shrink up, and now they present a curious appearance. The hand is wholly useless, and of a dead-looking gray color, as if no blood circulated in it, and has shrunk to nearly one half the size of the other hand. The nails are black, but still retain their hold upon the flesh. They have not grown any since the blow was given. Upon cutting the hand a little blood will stand in the wound, but it does not bleed like a fresh cut. There is no sign of mortification in the hand. The dead feeling reaches only a few inches up the arm. Wilder has no power over the hand and cannot close it. The bones of the fingers seem to have shrunk with the flesh, and to have softened to a substance resembling gristle. Several surgeons have examined the hand and declare that they never saw or heard of a case similar to this."

We remember a circumstance somewhat analogous to this which occurred some thirty years ago. A number of boys had been annoying a neighbor by throwing stones against his door. He rushed out and dealt one of them a blow on the arm between the elbow and wrist. The blow slightly discolored the skin, but from that night the arm was useless and assumed the appearance of a dead limb. We knew the young man for more than ten years after the occurrence, but no change ever took place in the condition of his arm. It remained in size a boy's arm, and in appearance and feeling dead.

Foreign-built and Home-made Machinery.

We have received a communication from Manchester, Va., in relation to the letter we copied in our issue of Feb. 2d, which attempted to prove the superiority of foreign cotton and woolen machinery over that of American manufacture. We have not room for the communication in full, but present its more salient features. The writer says:

Having been a constant reader of your paper ever since it was first started by Rufus Porter twenty-five years ago, except during the late war, when it could not be had here, I felt satisfied that an article like that you copied in the issue of Feb. 2d from a North Carolina paper would not escape the notice of the readers of the Scientific American without reply and such correction as it called for, better than I felt able to do; yet thinking the statement that I am about to make even at this late hour may add something to assist in setting public opinion at the South aright, I venture to appear before your readers, knowing no better medium to bring the subject before the mechanics and manufacturers of this country. I was pleased to read in your paper of Feb. 23d the able articles of several correspondents and successful manufacturers, although their modesty forbids them styling themselves "best manufacturers in the country," and an impartial public will see that they have established the fact beyond a doubt that American mechanics and American machinery are not surpassed by European. While the proofs and references they bring forward are ample, yet many more could be added The author of that article in the North Carolina paper asserts the same thing that I am about to show, and I want his Southern friends to note it. He boasts of the extra quantity of work done on his cards, and of all the goods made being sold, their agents in Baltimore reporting not a yard left. While his letter would convey the idea that it was the result of using that European machinery, the facts do not sustain this idea. Would your readers believe it, that those very cards which produced this large quantity of work were built by Alfred Jenks & Son, Bridesburg, Pa., before the war, and every loom in the same establishment is American, except one solitary, rough, unsightly English loom, which answers to the description given by your correspondent, Mr. Hooper, of Baltimore, of European machinery generally, in your issue of Feb, 23d? I visited this factory that the gentleman has the charge of some three months ago, and know what I state. I saw some nice machinery from Massachusetts, some from Richmond, besides the bulk built in Pennsylvania. This English loom was pointed out to me, also a picker from Germany, and some machine from Belgium. Any of your readers that wish to satisfy themselves in regard to these statements can do so, if they think the game worth the ammunition, by visiting the factory. It will be found not quite a thousand miles from Fredericksburg, in this State.

The letter in question bears the evidence on its face that it was intended for the eyes of Southern capitalists about going into manufacturing, and needing machinery. It is well your paper gave it publicity and that the assertions therein were contradicted. I would say to my Southern friends, even if I am not the "best practical manufacturer" south, that I have had some experience, and I would advise them to examine well and get practical men who fully understand the wants of this section of our country to assist in selecting, and my idea is that we can do better by getting late improved American machinery than by going abroad and buying in four or five countries by piecemeal. Some European machines may be had cheaper than our mechanics can turn them out; but "why?" ask some. Contrast the condition of the European mechanics and operatives generally with our American mechanics and the question is more than answered.

The Sudden Expansion of Prussia has raised her commercial marine from 1,665 vessels to 10,202, of 1,293,138 tuns; exceeding that of France by over 300,000 tuns, and making her the second commercial power of Europe.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Refrigerator.—William Law, New York City.—This invention has or its object to so improve the construction of refrigerators that the bottom of the ice chamber may not be liable to be injured by an accidental blow of the ice pick.

Molding Pulley.—William Neemes, Pittsburgh, Pa.—This invention has for its object to furnish an improved process for casting pulleys, by means of which they can be cast accurately and much faster than by the ordinary process.

Portable Fence.—Eli York, Windsor, Ill.—This invention has for its object to furnish an improved self-supporting portable fence, quickly and easily put up and taken down, and readily transported from place to place.

Cheese Vats.—O. Sage, Willington, Ohio.—This invention has for its object to furnish an improved cheese vat, by means of which the heat applied to the milk box may be regulated as desired, and the performance of the various operations necessary in the preparation of the curd, greatly facilitated.

Heat Extractor or Stovepipe Drum.—G. H. Hammond, Oneonta, N. Y.—This invention has for its object to furnish an improved apparatus for extracting the heat from the smoke and other products of combustion passing off through the stovepipe, and which would otherwise be lost.

Life-preserver Removable Berth for Vessels.—John J. Clyde, Williamsburgh, N. Y.—This invention consists in so constructing the berths of steamboats and other vessels that they may be removable, and may be watertight so that they may be used as life preservers to float their occupants; and so that by attaching several of said berths together, a strong serviceable and buoyant raft will be formed.

Ladies' Dress Comb.—F. A. L. Cassidey, Newnanville, Fla.—This invention consists in attaching to the ends of the body or back of ladies dress combs, two wing or side combs, to more securely hold the hair or head dress in place.

Water Filter.—Frederick Schickle and Evermont Randals, St. Louis Mo.—This invention relates to improvement in water filters for filtering and purifying muddy water, and consists of pipes and chambers so constructed and arranged that the muddy water shall pass from a receiving chamber or reservoir through a filtering body of sand, gravel, charcoal or other suitable porous and purifying compounds, into a supply chamber, from which the pure water is drawn off for use by a connected pipe and faucet.

Apparatus for Making Vinegar.—Wendelin Weis, St. Paul, Minn.—The object of this invention is to arrange an apparatus whereby alcoholic liquor may be converted into vinegar in the shortest possible space of time.

Constructing Houses.—John Parks, Joliet, Ill.—This invention consists in constructing buildings in such a manner as to make them strong and to require but a small amount of lumber in their construction, also making the walls air-tight and providing ample ventilation from the cellar to the top of the building.

Door Fastening.—John Decker, Sparta, N. J.—This invention relates to a portable door fastening such as are designed for travelers to fasten or secure the door of a bed chamber on returning. This object is to obtain a fastening which will be simple in construction, capable of being readily applied and one which will effectually secure the door and without marring it or the door frame.

Machine for Pressing Leather Seams.—William May, Binghamton, N. Y. The object of this invention is to construct and arrange a machine whereby leather seams of any description, whether straight or curved, whether used for boots or shoes or for saddles or for any other article whatever, may be pressed neatly and without trouble, said machine being of simple construction and cheaply made.

Hoisting Apparatus.—A. R. Lemen, Kalamazoo, Mich.—This invention consists in so constructing an apparatus that it may be used for elevating heavy weights by the application of a small amount of power.

Sulky Plow.—O. P. Dils, Falmouth, Ky.—This invention consists in a peculiar construction and arrangement of parts, whereby both the plow and the carriage or sulky part of the device are allowed to conform perfectly to the inequalities of surface over which they may pass and an implement of light or easy draft obtained.

Seed-dropping Attachment for Hoes.—A. F. Large, Chicago, Ill.—This invention relates to a seed-dropping attachment for hoes already patented. The object of the present improvement is to simplify the original patented device, economize in the construction, and at the same time retain all the advantages it possesses.

Mounted Swivelling Boot Tree.—Reuben L. Lewis, Worcester, Mass.—This invention consists in the arrangement of a laterally-adjustable heel plate whereby the counters of boots are pressed out, said heel plate consisting of two parts which are hinged together and which are operated by a differential screw so as to be adjusted on boots of any size; and the invention also consists in the manner of attaching and operating the adjustable back, whereby the same can be adjusted to a great number of different-sized boots.

Cutting Threads on Bolts, etc.—Francis Schweizer, New York City.—This invention relates to a machine whereby screw threads can be cut on two bolts at the same time without using more power than would be requisite to cut a thread on one bolt.

Paint.—Henry W. Bradley, New Berlin, N. Y.—This invention relates to a new composition for paint whereby a very cheap consistent and glossy paint is manufactured and one which will dry faster than the ordinary paints generally do.

Clock Alarm.—John Decker, Sparta, N. J.—The object of this invention is to obtain a simple, cheap and portable clock alarm which may, whenever required, be applied to a clock by any one in a moment of time and without any difficulty whatever.

Burglar-proof Lock.—Adam Leich, Brooklyn, N. Y.—This invention consists in apylying three checks to the bolt of the lock in such a manner that the whole three of the checks will require to be operated upon by the key at the same time and held in a position free from the bolt, while the bolt is moved by the key. The invention also consists in combining with the three checks aforesaid, a partition plate so arranged as to prevent the bolt and checks being operated upon except by a proper key.

Anti-rheumatic Compound.—Jacob Schmoll, New York City.—This invention relates to a liquid compound which is intended particularly for the purpose of counteracting rheumatic and similar attacks and which when rubbed on the afflicted part, affords almost instantaneous relief.

Spring Cuff.—Isaac Levine, New York City.—This invention relates to a cuff which, instead of being made in the form of a closed cylinder as usual, is cut open at one side and provided with a coiled spring which allows the hand to pass freely through the cuff, and which after the hand has entered causes said cuff to clasp the wrist tightly and to produce a good fit.

Fan Blower.—Franz Engel, Camden, N. J.—This invention relates to a fan blower which is based on the principle of the archimedian screw. The screw, which is formed of two steep spiral flanges resembling a double screw thread, is fitted in a cylinder from the bottom part of which extends the spout or blast pipe. The upper part of the screw which projects above the cylinder is provided with a cylindrical jacket so that by revolving said screw the air is caught and forced out through the spout or blast pipe with considerable force.

Agricultural Fork.—Thomas Beale, New Milford, Ill.—This invention relates to a fork for spading up the earth, digging esculent vegetables and roots, and has for its object ease of labor and a greater facility in manipulating the implement.

Car Coupling.—Ezra Staples and W. W. Gould, Skowhegan, Maine.—This invention consists in constructing a safe and effectual apparatus by which railroad cars may be easily coupled together and uncoupled without danger to life or limb.

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SECURING TIRES ON THE WHEELS OF VEHICLES.—Andrew C. Barnes, Albia, Iowa.—This invention relates to an improved manner of securing tires on wheels without the aid of the bolts usually employed for that purpose.

CHURN DASH.—A. B. Hutchins, Patchogue, N. Y.—This invention consists in constructing a churn dash in such a manner that it will be rotated by an up and down movement in the operation of churning and the cream thereby subjected to a violent agitation which will cause the butter to be produced within a very short period of time.

COTTON CULTIVATOR.—W. McCracken, Bainbridge, Ind.—The object of this invention is to obtain a cotton cultivator which will dispense with much labor hitherto required, and it consists in the use of a plow and scraper arranged in a novel way, and also in a hoe arranged and applied in such a manner as to operate automatically under the draft movement of the device, and in a direction transversely with the row of plants for the purpose of thinning out the latter at regular and proper intervals.

SELF-OILING AND SELF-ADJUSTING BEARING FOR MACHINERY.—Thomas S. Brown, Poughkeepsie, N. Y.—The object of this invention is to obtain a bearing for the shafting of machinery which will be self-lubricating and self-adjusting, and also be capable of adjusting itself in line with the shafting, in case the bearings be not set perfectly in line with the shafting in adjusting machinery together.

WATER FILTER.—George Waite and John Watts, New Orleans, La.—This invention consists in forming the filter and cooler in such a manner that the weight of the water shall be exerted to force the lower portion upward after it has passed through the filteringmaterial.

PISTON PACKING.—John Askwith, Chicago, Ill.—This invention consists in the formation of the joint of the packing ring, and in the provisions made for keeping it expanded to the cylinder steam tight, and in a central position.

REVOLVING WAIST BLOCK.—William T. Adams, Baltimore, Md.—The sheave around which the sheet or other rope is passed is journaled in a disk which is permitted to rotate to keep the axis of the sheave at right angles to the direction of the rope. The sheave is journaled within the rotating disk and projects from each of its faces so as to deliver a rope which passes around it without impediment, both ends in the same direction or near it.

SELF-CLOSING AND SELF-LOCKING RAILROAD SWITCH.—Judson F. Jones, Washington, D. C.—The switch lock holds the switch upon the main track except while forcibly and temporarily held upon the turn out. When the switch lever is released the spring returns the switch to the main track, the locking bar automatically engaging with a tooth of the switch bar; the locking bar cannot be disengaged except by the key which elevates it, and is released for subsequent engagement by the descending switch lever.

STEAM ENGINE.—George I. Washburn, Worcester, Mass.—This engine has two double acting pistons, each operating by itself in its steam cylinder and attached to a piston rod which carries a valve of any suitable construction operating in its own chamber. Each valve controls the action of the steam upon the double acting piston in the opposite cylinder and not that piston to which it is attached. A valve upon the eduction port or in the exhaust pipe, opening outwardly, closes the aperture against the reflux of exhaust steam.

TWEER.—Daniel S. Loy, Graceham, Md.—The air from the bellows entering the blast chamber acts upon a wing and actuates the valve which closes the lower aperture of the chamber. When the blast ceases, the valve opens, discharges the cinders and admits the passage of air to the fire. Different forms of blast plates are used as caps fitting upon the rim which bounds the upper end of the blast chamber and the cinders are conducted by an adjustable pipe in such direction as may be suitable for their discharge.

SASH-CORD ATTACHMENT.—Carlos Swift, Mount, Carroll, Ill.—This invention relates to an ingenious, simple and effective device for attaching cords to window sashes.

WASHING MACHINE.—Mark Newland, Dayton, Ohio.—This invention consists especially in the combination of the double spring connecting rod, by which the rubber is operated with the rubber frame and with the crank shaft.

CORN-CAKE MACHINE.—C. C. Harriman, Warner, N. H.—This invention has for its object to furnish a neat and convenient machine for cutting out cakes of uniform size and thickness in batches of one hundred, two hundred, or more, as may be desired.

SEED PLANTER.—A. Bennett, Rockford, Ill.—This invention relates to an improvement in the construction of corn planters, whereby one man or boy with a double team may drop the grain at regular intervals in two rows, opening the furrow, and rolling the seed after they are dropped at the same time, thus completing the planting in one operation by a self-acting apparatus.

CLOTHES FRAME OR RACK.—Benjamin Britten, Galena, Ill.—This invention consists in so constructing a clothes rack or frame, that it can be folded up into a compact shape, suitable for being encased within a hollow tube or cylinder, that when the said rack is drawn out serves as its standard and support.

MANUFACTURE OF IRON AND STEEL.—Charles Usher, Iowa Falls, Iowa.—This invention consists in a novel manner of plating wrought iron or steel with malleable iron.

CUTTER FOR TRIMMING WALL PAPER, ETC.—Henry C. Snow, Princeton Ill.—This invention relates to a cutter or implement for the trimming of wall paper more especially, whereby it can be trimmed with the utmost facility, accuracy, and rapidity.

LOCK.—James S. Porter and Russel Porter, Waterford, N. Y.—This invention consists in the combination with a lock of a pistol, in such a manner that when a key is placed in the lock and turned for the purpose of unlocking it, the pistol will be discharged, thus operating as an alarm.

FRUIT JARS, ETC.—G. W. Buffington, Mechanicsburg, Ohio.—This invention consists in a novel manner of securing an elastic web or band to the jar cover, in connection with a peculiar form of the neck of the jar, whereby many advantages are obtained.

BOOT AND SHOE.—Joseph C. Adams, New London, N. H.—This invention relates principally to the heel of a boot or shoe, and consists in making the heel of metal and hollow, with its under plate constituting the treading surface, secured to the main portion of the heel in such a manner as to be easily removed therefrom.

LOCK.—Zeno Kelly, New Bedford, Mass.—This invention consists principally in the application to the link or shackle bar of a padlock of a seal or seals in such a manner and in combination with any suitable arrangement of devices for locking or holding such link or shackle bar in the lock casing, that before the lock can be unlocked, said seal or seals must be broken, or, in other words, punctured by the insertion of the key or of any other implement into the lock for opening or unlocking the same.

BED SPRING FASTENING.—D. Manuel, Boston, Mass.—This invention relates to an improved device for fastening the lower end of spiral wire bed springs to the slats, and also for securing their upper ends to the frame bars in such a manner that the springs will keep their vertical position, and the whole frame may be raised without deranging or moving the springs.

GATE LATCH.—W. H. Kellogg, Du Quoin, Ill.—This invention relates to a device for a self-closing latch to a gate, which will open either way, and may be opened very readily, being more especially adapted to small gates that are often passed, and require a convenient as well as sure fastening.

WOOL PRESS.—Spencer C. Bond, Farmersville, N. Y.—This invention relates to a wool press, the press box of which is composed of two hinged wings and two sliding heads. The hinged wings compose the sides of the press box, and they connect by cords or chains with a lever, in such a manner that by depressing said lever the wings are turned up simultaneously. The movable heads are attached to rods which slide in a suitable recess in the platform or bottom of the press box, and said rods are connected to the bolts (threads of which are secured to a windlass or drum), in such a manner that by turning said windlass the heads are drawn together, and the operation of pressing is effected. By adjusting the cords or ropes in a proper position previous to putting the fleece in the press box, the operation of tying the packs after they have been pressed is materially facilitated.

FRUIT GATHERER.—John Frantz, of Joseph, Shelbysport, Md.—This invention relates to a machine constructed to gather apples, potatoes, or other fruit, from and off the ground,

SHAKING TABLES FOR CONCENTRATING ORES.—P. S. Buckminster, Gold Hill, Nevada.—This invention relates to an improvement in shaking tables for concentrating sulphurets and other heavier mineral portions of gold and other ores, and consists in a novel plan for constructing and arranging the grooves or riffles in the bed of the table, by which the operation of separation of the heavier mineral from the lighter earthy matters in the ore is rapidly and thoroughly performed.

LIFTING JACK.—Daniel Diver, Boone, Iowa.—This invention has for its object to furnish an improved lifting jack, designed especially for raising or leveling railroad tracks, but equally adapted to other uses.

MEDICAL COMPOUND.—Wm. B. Foster, Ridgeville, Ohio.—This medical compound is specially intended for the relief and cure of cholic, cholera morbus, cholera, diarrhœa, heart disease, rheumatism, white swelling, etc.

COMBINED BRIDLE AND HALTER.—J. McKibben, Lima, Ohio.—This bridle and halter is simple, convenient, and durable.

INVALID CHAIR.—John N. McMullen, West Liberty, Ohio.—This invention consists in the employment of a shaft arranged transversely under the seat of the chair, to which is connected a belt or belts whose ends, not being connected to the roller, are secured respectively to the back of the chair and to the bottom of the foot rest. Said roller being also provided with a toothed wheel having a crank, which, in connection with a pawl, enables the person occupying the chair to give both the back and foot rest the desired inclination.

DRAFT PIPE FOR LOCOMOTIVE ENGINE.—A. Pearsall, Atlanta, Ga.—The object of this invention is to equalize the draft through the boiler flues, thereby improving the effective operation of the engine.

BALE TIE.—Barry Coleman, Louisville, Ky.—This invention relates to an improved device for fastening the hoops of cotton or other bales, and consists in a single iron plate slotted in such a manner that the ends of a bale hoop may be readily passed through it, and secured so that they shall not slip.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Wanted.—Best wool carding and spinning machines and power looms. Manufacturers send circular and price list to C. Picard & Co., Nebraska City, Nebraska Territory.

Manufacturers of House-furnishing Goods (Hardware) will please send their address and circulars to S. W. Johnson & Co., Detroit, Mich.

Photographer, Box 5,830, New York Post-office, wishes to obtain the address of the person who has applied for a patent for discerning the presence of ghosts or spirits in a room.

N. Evinger, of Sandford, Vigo county, Ind., wishes to engage with scientific parties as inventor. Also to sell his foreign claim on a very useful machine, patent pending.

Wanted.—An agency for some desirable and salable patented article that will work well with the retail hat and cap trade. Address W., Lock Box 122. Erie, Pa.

E. Roth, New Oxford, Pa., wishes to know where he can get malleable casting done. Patterns furnished.

Evans's Patent Graduating Circular Hand Plane for finishing curved surfaces. Send for circular to F. H Webb, Hudson, N. Y.

Wanted.—A situation as foreman or to work by the contract by a practical machinist with good reference. Should like to go West. Address Machinist, Box 665, Worcester, Mass.

Manufacturers of wood-turning machines of any kind other than the ordinary laths will please send cut and price to Geo. W. Sweet, Flint, Mich.

Rouse & Dean, Dubuque, Iowa, wish to correspond with manufacturers of lead-pipe machinery.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

O. J. F., of Mich., asks:—Of two portable engines having the same amount of fire surface, one having 20 three-inch tubes 58 inches long and the other 16 three-inch tubes 72 inches long, which is the most efcient, or is there any appreciable difference in their efficiency? Ans: The 20 tubes present 24 inches surface more than the 16 tubes, and as the engines are portable, depending upon natural draft, we should prefer, in selecting an engine, the one with the shorter tubes, and think it would be more efficient.

D. S. McD., of Ill.—Water when frozen expands. As the sap, etc. in green wood is largely composed of water, freezing green timber will expand or burst it. Trees in exposed situations sometimes crack by intense cold. Freezing green wood is not analagous to seasoning it.

A. P. R., of N. Y.—A fly wheel acts as a fly wheel whether it is used as a pulley or not. See reply to W. K. of Ind., in No. 11 SCIENTIFIC AMERICAN.

C. B., of Conn.—We have seen the hammer you speak of in use and like it. If you wish for particulars see SCIENTIFIC AMERICAN Vol. XV pages 134 and 383.

W. A. W., of L. I.—We think better results will accrue if you use salt rather than brackish water in your boiler. The latter is apt to induce foaming. Why not distil your salt water and use it fresh? Your communication appeared in No. 10.

P. G., of Ill.—Round twisted belts of leather are manufactured so that they will not stretch more than flat belts. They have a solid longitudinal core of leather, untwisted and stitched to the outer envelope. They are very superior. Belts of only one quarter of an inch or less in diameter are cut from the solid leather. Gut belts of this size are better.

G. W. T., of R. I.—Rollers on shuttles for weaving were used to our recollection twenty-five years or more ago, but were rejected for the simpler form of smooth bottoms. We do not think rollers are an advantage.

J. G. S., of Minn.—We do not advocate the indiscriminate use of oil on taps. Sometimes a clean tap will work better in cast iron than one with oil. Much, however, depends upon the way in which the tap is made. If it has a good clearance it may work better without any lubricator. You may be sure that a tap with too much thread will not *cut* a screw thread but only jam the thread.

M. R., of Conn.—For making black lead crucibles, mix two to four parts of black lead with one part of clay. The ingredients should be finely powdered, thoroughly mixed, and after being got into the desired form by molding and pressure, must be thoroughly dried. The crucible is finally baked in a close oven. The quality of the crucible depends mainly on the freedom of the b ack lead and the clay from iron and lime.

W. E. B., of Ill.—The average boiling point of petroleum burning oil is about 350 deg. Fah.

C. B., of Mich.—If you take a sheet of raw rubber and soften it with naphtha till it becomes softened, you may succeed in getting it into the form you desire. After being thus molded it may require some days for the solvent to evaporate and the rubber to become hard.

M. B. L., of Ill.—Hydrogen in most of its chemical relations is like the metals. But it lacks the physical and sensible properties which are commonly considered to be characteristic of metals. We have never seen a definition of a metal which could include hydrogen.

H. W. H., of N. Y., has a new silver watch. He says "spots of yellow rust begin to show themselves on the inside of the case. What is the cause?" We suggest that this watch like the celebrated razors, was made to sell. If we knew that it was a relic of some gift enterprise or mock auction, we should test those yellow spots for brass. Silver and gold now-a-days like some other virtues are only skin deep. The vitality of jewelry is generally due to galvanism.

J. S., of Ill.—The mineral you send is very fine sand and is sometimes used under the name of tripoli for polishing metals. Genuine tripoli, however, is composed of infusorial siliceous shells.

J. G. N., of Vt.—Small articles of steel generally receive their final finish by tumbling with small scraps of leather.

J. L., of Ill.—The pasting up of millstones may be due to the grain being too moist, or to the stone being too fine. The remedy in each case seems evident.

J. V., of Ala.—The optimeter is an instrument for determining the focal length of spectacles suitable to those who are to use them. An object of any convenient size as a line drawing or a paragraph of printed matter is set up, and the person whose eyes are to be tested places himself where the object can be distinctly seen. The distance from the eyes to the object will determine the focal length of the spectacles. But as this distance will vary with the size of the object, the person who is to use the device must determine by a few preliminary experiments on different persons, the relation between the distance and the focal length. The simplest form of the instrument is one tube sliding within another. The outer tube is stationary and has an object on its end. The inner tube slides in the outer and is graduated in inches. To operate it, look into the inner tube and slide it forward or back till the object is seen most distinctly. The focal length of the required spectacles may now be read off from the graduation. When the graduation is properly made, the instrument is quite useful for those who make it a business to fit people with spectacles.

J. C., of Conn.—A solution of rubber in turpentine or naphtha is called rubber cement and is sometimes useful in mending rubber goods but it does not adhere very well to vulcanized rubber, and the joint is always weak.

O. C., of Mass.—Ice is crystallized water. In the act of crystallizing, the particles are rearranged or polarized so as to occupy more space. This is all the explanation which is given of the fact that water expands in freezing. Water will not be expanded any the less when frozen in a vacuum, and your bottle of water tightly corked, and frozen under the exhausted receiver of an air pump will burst.

H. B. S., of R. I.—"1. What do we understand by the essence of matter? 2. What is the limit of our knowledge of the nature of matter?" (1.) The essence of matter may be defined as that which remains of matter after abstracting its properties; or as that to which the properties of matter are attached. This is a very excellent definition, but who understands the essence of matter? (2.) In the present condition of science we know nothing of matter or the nature of matter beyond or behind its essential properties. Is a knowledge of what is behind the properties so very desirable? There is abundance of knowledge which is both desirable and attainable.

A. W., of Ky.—Messrs. Hoe & Co. make a press that prints on both sides of the sheet at the same time, but the lightning press so known only prints one side at a time.

D. O., of Ill., sends us a long and somewhat ingenious essay with the intent to prove that electricity is the explanation of gravitation, heat, light, chemical action, and in short of almost everything. Such speculations are not new. They seem to be based upon an imperfect notion of what electricity really is.

A. C. R., of N. Y.—You will probably succeed in removing the smell of the gas from your gutta percha and other tubes by immersing them in a weak solution of per manganate of potash.

G. T. M. L., of N. Y. says:—"A little roasted pure coffee eaten without further preparation, will immediately relieve that species of indigestion which causes sourness, or broiling of the stomach."

E. C. G., of Ind.—A galvanized telegraph wire will last longer than a plain wire, whether above or under ground. The time that the buried wire will endure, depends upon the nature of the soil. An acid or salt soil might use it up in a few weeks while in loam or sand it would last for years.

D. M., of N. Y.—When steam is let on to the engine, the pressure being relieved, the water begins to boil violently. In such circumstances an extraordinary amount of steam is generated, and the steam gage for a moment indicates increased pressure. The case may be illustrated by a simple experiment. Provide a glass flask with a good cork. Boil water in the flask, press in the cork, and after the heat has continued for a moment, slightly loosen the cork, and it will be evident that at the instant of loosening, the pressure is increased. If the experiment be dexterously performed, the flask may be burst by this paradoxical pressure.

W. F. D., of Mass.—You may easily distinguish vulcanized from raw rubber. Raw rubber is softened and dissolved by benzole, gets stiff and hard by cooling to 32°, and the finger nail when pressed on it leaves a permanent impression. Per contra, none of these things happen with good vulcanized rubber. Moreover, vulcanized rubber when burned gives a sulphurous odor.

J. N. H., of Mich.—No exact position has been fixed for the meridian from which the day should start. If it is ever established by statute (which is probable) it is likely that the same meridian will be continued from year to year, and thus the beginning of the year will be reckoned from it also.

PATENT OFFICE DECISIONS

BEFORE THE BOARD OF EXAMINERS-IN-CHIEF OF APPEAL.

ELISHA FOOTE for the Board.

The claim must cover the precise novelty of the invention.—Application for a patent for improvement in breech-loading fire-arms.

The rear part of the applicant's breech block is composed of two arms. The upper one extends back to a socket that forms the joint on which it turns. The lower one is shorter and fits when the block is in position to close the bore against a fixed shoulder on the breech. The block is thus supported at both the top and bottom against the force of the explosion, and at the same time it can be dropped down, turning in the socket befor mentioned, until the upper arm strikes against the fixed block and that unlooses the bore for the insertion of another charge.

This arrangement gives solidity to the structure and much simplicity and apparent practicability, and we do not find it in any of the references given.

The first claim is liable to a construction that would render it entirely too broad. It is for the breech, C, constructed as described, etc. This is about the language which would have been use by the person who first invented a breech adapted to a movable block and who did not intend to confine himself to a particular form. And in this broad sense the claim seems to have been understood by the Examiner in charge. Had it been specified for the peculiar construction of the breech, C, having the shoulder, M, as described, a different conclusion might have been arrived at by the Examiner.

His decision in reference to this claim is affirmed, with the recommendation that the applicant be allowed to amend and present it for re-examination.

Application for a patent for an improvement in engraving.

The applicant claims his process of engraving substantially as described. In his argument he admits that a part of the process is old, and consequently he has omitted to comply with those provisions of the statute which require the applicant to particularly specify and point out the part, improvement or combination which he claims as his own invention or discovery. Curtis, in his treatise on patents (sec 131), says in reference to this provision:—"This involves the necessity in all cases where the patentee makes use of what is old, of distinguishing between what is old and what is new. He is required to point out in what his invention or discovery consists; and if he includes in his description what has been invented before without showing that he does not claim to have invented that, his patent will be broader than his invention, and therefore void."

The Examiner was therefore right in rejecting the application as it was presented. The applicant has submitted to us an amendment intended to remedy the defects alluded to. This we have no power to receive. Our powers are those of review only—to determine upon the validity of decisions made.

The application must go back to the Examiner for him to investigate the new questions presented, before we can have anything to do with it. The Examiner's decision is affirmed, with the recommendation that an amendment be allowed.

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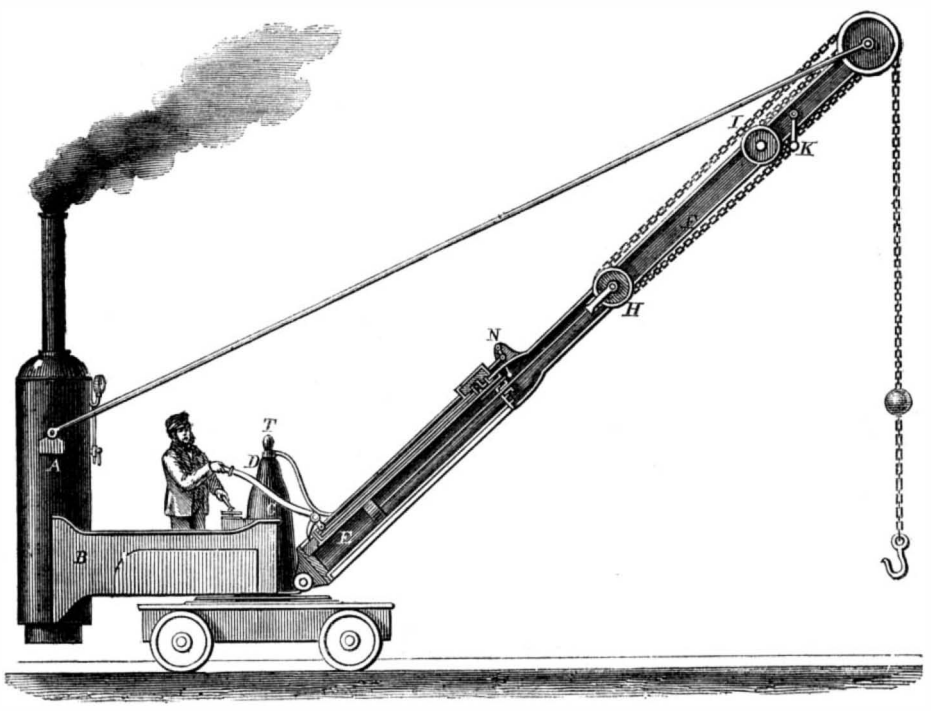
Portable Steam Crane.

Steam cranes have within a few years come largely into use at manufactories of heavy machinery, in dock yards, and at other points where their lifting services are often required; but usually they are permanent fixtures, and the weight to be lifted with, that of the jib, is counterbalanced by the action of guys or the holding force of a firm standard. In the one herewith represented, which is the invention of Mon. J. Chretien, a description of which we find, in the London *Mechanics Magazine* the boiler and tender serve as a counterpoise to the weight to be lifted.



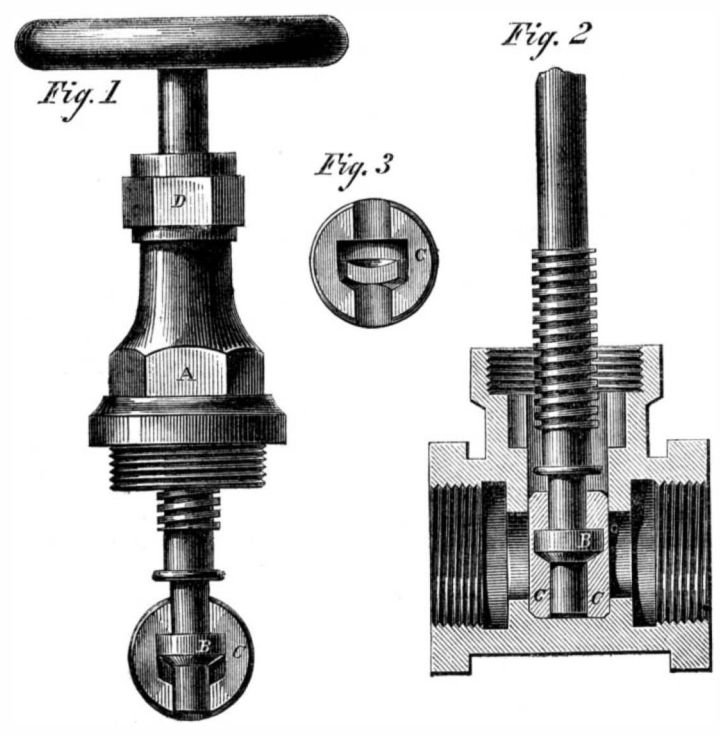
A CONVENIENT PORTABLE STEAM CRANE.

A is the boiler suspended from the rear of the tender, B, carrying the fuel and water. The jib, F, of the crane is of iron and hollow, containing the steam cylinder, E, in which works a piston connected to a pair of pulleys, H, over which the hoisting chain passes, one end being secured to the jib at K, near the intermediate pulley, I. The steam is admitted at N, and the double tie bars, G, connect the point of the jib and the boiler. The lever for regulating the action of the steam is shown at D and a dynamometer at T.

By this crane it is claimed the weight of the load can be denoted, and the utilization of the hollow of the jib as a steam cylinder appears to be novel and useful. No further explanation seems to be required to give a pretty correct idea of this machine. It seems to be compact strong, and readily managed. It has been and is still extensively used abroad and gives good satisfaction. We invite the attention of our manufacturers and others interested to this device. We should think the builders would find a ready market for their machines.

Improved Gate or Valve.

The accompanying engravings illustrate one of the most perfect gates for steam, gas, and liquids we have ever seen. It seems almost impossible that it should get out of order and it does not in any manner interfere with the direct flow of the fluid. Outwardly it resembles a T-connection to a pipe, there being no protuberance to accommodate the valve. The stem of the valve is tapped through the upright, A, in the usual manner, and is furnished near the lower end with a projecting collar, B, on which are suspended discs, C, by suitable recesses on their inner faces, seen plainly in Fig. 3. These discs are enough larger than the aperture through the pipe and gate to give a bearing all around their circumferences when seated against the walls of the valve, as seen in Fig. 2 A perspective view of the upright, hand-wheel, stem, and one disc is given in Fig. 1. A vertical sectional view of the valve taken longitudinally, with the stem, and both discs is shown in Fig. 2; and Fig. 3 is a disc showing its inner face. By the action of the stem on turning the hand-wheel these discs are raised or depressed, they being suspended on the stem by its collar engaging with the semi-circular recesses on their inner faces, and prevented from separating from the stem by the walls of the passage in which they move. The lower face of the collar, B, and the lower portion of the recesses in the disks are made slightly conical, so that after the discs have reached the bottom any further pressure on them by the screw of the stem, forces them apart and firmly against the walls of the valve, thoroughly closing the apertures of the pipe. The conical collar, therefore, acts as a wedge aided by the pressure of the screw. It will be seen that both sides of the pipe are closed by this means, making this a back pressure valve as well as a direct acting gate. When the discs are raised, a free passage, without change of direction, is made through the valve for the steam, water, or gas, of the full size of the pipe. The stem is packed in the usual manner by the screw gland, D.



PEET'S GATE OR VALVE.

The joints formed by the faces of the discs and the walls of the valve meet the force of steam or gas at right angles, obviating the wearing or filing action of the steam, which in other gates, in time, affects the security of the joint. A single joint closed by the action of a screw cannot be opened without exposing the valve to this cutting by the steam. The closing power in this valve being applied to the center of the discs, the operation is always uniform and the joints perfect all round. In fitting this gate to pipes, the shell, being virtually solid, no amount of wrenching can disturb the joints of the discs. It is well known to mechanics that the change of direction given the steam in the ordinary globe valves and gates occasions a loss of its force and more or less condensation. This is impossible with the gate under consideration as no change of direction or retardation of force can occur, the passage being as direct and unobstructed as in the pipe.

This improvement was patented through the Scientific American Patent Agency January 1st, 1867, for the United States, and in Great Britain. Further information may be obtained from the patentee, Samuel J. Peet, 33 Beekman street New York City.

THE GAS QUESTION.

We have received from the city of Boston a voluminous document on the manufacture and inspection of gas, being the report of a special committee appointed by the Common Council to inquire whether it would be expedient for the city to build works for supplying its citizens with gas at a minimum cost. The investigations of this committee have more than a local interest, for their purpose was not merely inquiry into the quality of the gas furnished by the existing Boston company, or its prices as compared with those of other cities, but rather to consider the subject in a general way and base their conclusions on general principles. As the result of their labors, many facts of interest to the community at large have been brought to light, that otherwise would have still remained among the unpublished trade secrets. Many of the witnesses called were those holding important positions in these corporations, all well versed in the details of their management, and hence the information often inadvertently given is of much value.

It appears that there are four hundred and sixty towns in the United States where gas works are located, the consumers numbering nearly eight millions. The amount of gas produced every year, it is estimated, would fill a gas holder six hundred and eighty acres in extent, and three hundred and thirty feet high. The amount of capital invested in these companies is now over fifty-five millions of dollars. The stock is always above par, and is held by rich corporations who furnish consumers with gas at high and excessive prices. The city of Boston is not the first in taking stand against these monopolies. Detroit and St. Louis are now agitating the subject of protecting public interests by furnishing their citizens from city works. Philadelphia and Chicago are making their own gas. Cincinnati has purchased her gas works at a cost of two and a half millions of dollars, and careful estimates show that if consumers are charged two and one half dollars per thousand feet, in eight years the city will realize, over and above the first cost, half a million of dollars.

The enormous profits of the existing gas companies, was a fact made apparent to the committee as the investigation proceeded, and led them to the conclusion expressed in the report, that water and artificial light, as the two great necessities of a city, should never be sold at a profit, nor ever be in the hands of a private corporation. The evidence showed that the existing company of that city has made, and is making, twenty-five per cent profit on every thousand feet of gas sold to the city or citizens, and has cleared during the thirty-three years of its existence, upwards of three millions of dollars. Nor is this an exceptional case: the same may be true, or even fall below the truth, in regard to all companies in cities throughout the country.

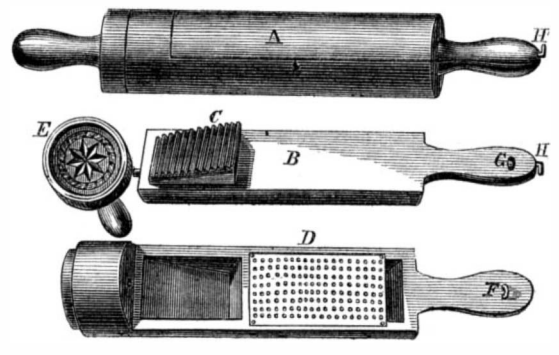
In regard to the actual cost of making gas, it was testified that during the year 1865 the average price of coal in twelve principal cities was $11·39 per gross tun: add to this $4·70 per tun as the price of labor and of the lime used in purifying, we have $16 as the total expense for converting each tun of coal into from 8,000 to 9,000 cubic feet of gas, the cost for each thousand feet being $1·88. This statement was admitted on all hands to be a fair estimate, yet the Manhattan company of this city professes to be doing a ruinous business because compelled by their charter to supply all consumers at $2·50 per thousand feet, while prices of the other companies of this city and vicinity range from $3·25 to $4.

After summing up the mass of evidence detailed at length in the pamphlet before us, the opinion of the committee was given decidedly in favor of making the gas supply a public function. For sanitary considerations, and on account of the inevitable decline in the value of real estate surrounding gas manufactories, it was recommended that the contemplated new works be located beyond or at some distance from the densely populated districts of the city. As it was not deemed advisable that the proposed change be made at present, owing to the high price of labor and material, the committee further urged the appointment of an inspector of gas and gas meters, whose duties shall be the regulation of gas companies and the better protection alike of the city and consumers generally.

We see no reason why the proposition of the committee should not be carried out in every city and town where it is profitable to manufacture gas. If it will pay individuals, the authorities are warranted in the conclusion that they might also undertake the gas supply without loss.

IMPROVED COMBINATION CULINARY UTENSIL.

The implement shown in the engraving may be styled the cook's *multum in parvo*, as it is a combination of not less than six different instruments used in the preparation of food. At A, it is seen simply as a rolling pin, which can be separated into three parts, as seen by the division lines on A, and by the parts in the other figures. B is a beef-steak pounder, the plate, C, of metal being inclined at a convenient angle for use. D, is a grater for nutmegs, horse radish, etc., the plate of which is secured by a pin latch at each corner, by turning which the plate can be removed and another, coarser or finer, substituted. The plate does not cover entirely the aperture in the rolling pin, but a space is left at one end to receive the



grated spice. E is one end of the roller, which screws on the pin, and when separated is a butter print, as seen. The parts longitudinally separated are held together by a dowel pin at the end of the steak breaker that engages with a corresponding hole in the rolling pin, and by a staple, F, fitting into a recess, G, and secured by the spring pin, H. This combination is the subject of a patent procured through the Scientific American Patent Agency, Nov. 13, 1866. For state and county rights address the patentees, Richardson and Williamson, corner of Ohio ave. and Bidwell street, Alleghany City, Pa.

The Good Old Times.—A catalogue of great European frosts has been published, from which it would seem as if the glacial period in Europe need not have been indefinitely remote in the past, after all. Some of the experiences of the Middle Ages have not been matched since, in this line. The last time the Thames was frozen over at London, was in 1838. This has occurred four times in the present century, viz., in 1813, 1820, 1823, and 1838. From elder times, we have notice of only very remarkable frosts, which in the eighteenth century occurred six times, viz., in 1708, April of 1709, 1716, 1740, 1788, and 1794. At the second of these dates the Mediterranean froze at Genoa and Leghorn, in the third the Thames was used as a solid pavement from Nov. 24th to Feb. 9th, and during the same term, to a day, in 1413. In 1063, the Thames was frozen over for more than three months, and in 1334 a frost continuing 80 days froze the rivers in Italy. In 1622, the Hellespont was frozen.

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VOL. XVI., No. 12....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, MARCH 23, 1867.

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CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39. Our reason for making this announcement will be made to appear by reference to a notice published on page 172, last number, under head of "Police Intelligence."

SPECULATIONS ON THE FUTURE.

The able Editor of *Engineering* follows up a review of the more recent achievements in the arts with an outline of those which seem to be indicated as next in order. Farming must become a branch of engineering, with its recognised professors and professional authorities, and advanced means of improvement. Little or no waste land must be left in England. Besides steam plowing, underdraining, sanding clay and claying sand, and sewage irrigation, the agricultural engineer is to saturate the soil with carbonaceous and nitrogenous elements by penetrating it with the products of the combustion of slack coal led through the land in flues. Land will yet be made to possess almost unlimited power of production.

We must dismiss the lumbering system of "trains" for high-speed traffic, and resort to a single vehicle combining engine, tender and carriage, in which fifty passengers may go at an average rate of sixty miles an hour at moderate cost, and with but forty or fifty tuns of total weight in motion. (The obstacle to rapid traveling on railroads at present, is the great weight and unsteadiness of the vehicles, involving an enormous waste of power and increase of risk at high speed). As for goods traffic, except express freighting, we must go back to and modernize water carriage, penetrating all parts of the country with a water system, of rivers and canals, for steamboats of 250 tuns burden. A new class of ocean steamers must be had, 500 to 600 feet long, twin-screwed, and driven at the rate of 16 miles an hour, making the Atlantic passage in an average of eight days. The only requisites wanting to success in such steamers, are a full line with regular and frequent departures, and a profitable reduction of fares. A single ship like the Great Eastern can never be filled up, because nobody wants to wait for her to the end of a month or six weeks, when inferior steamers are sailing every two or three days.

In regard to motive power, thousands of readers would be astonished if it were now published *who* has said that the days of steam are already numbered, and that hot air is to become the great motor (pending the subjection of electricity to the yoke).

Probably few have formed any conception of the immense change in building which is to follow the recent perfecting of artificial stone. It has been exposed to every conceivable trial, by boiling, freezing, acids and foul gases, with some four years practical use, and appears to be unalterable—an almost incomparable stone, in all the artistic forms and colors that may be desired, at a cost less than that of brick. Hydraulic elevators are referred to as destined to supersede the use of stairs, to a great extent and to a vast saving of weary, slow and unprofitable toil.

One of the grandest improvements that must now be imminent, is the perfection and general adaptation of the Bessemer process, for the conversion of all kinds of iron direct from the blast furnace into bars and castings of steel, with mechanical treatment of whatever character in the melted condition. Mr. Bessemer himself has made excellent tin plate sheets, which would fold like a newspaper, one fold across another, without cracking at the corner,—merely by pouring the contents of a crucible of melted steel between a small pair of rolls without any other working whatever!

In warfare, the day of piston shot and gigantic guns is coming. A 20-inch shot will be fired from a 40-inch gun; a shot of a tun weight, with an initial velocity of 1,600 feet per second from a charge of 450 lbs., with but little greater destructive strain upon the metal of the gun than in the old fashioned cast-iron ordnance, and with an effect of ninety-million foot pounds, sufficient to punch a 20-inch hole in a good wrought iron plate 28 inches thick, and to go through any now existing iron-clad like a wicker basket! There are (says the writer) clear and demonstrable principles on which such guns may be constructed. In the field also, great changes are before us, not only in rifles but in bullets, in which the explosive principle is yet to be applied with all its terrible efficiency.

THE RIGHTS AND WRONGS OF THE PATENT OFFICE.

The Report of the Commissioner of Patents, which we republish in this paper, is important enough and short enough to be read by everybody, and we could especially wish it read by every member of Congress. Eloquence could add nothing to the almost pathetic facts which make up this unadorned statement, or one would be tempted to wish the Commissioner had taken the opportunity to urge the just complaint of the Inventors more at large. In the first place, there is the tabulated history of the institution, in figures, for thirty years. And what does it show? Why, that the Inventors of the country, wealthy only in genius and enthusiasm—"poor, but making many rich"—have built up unaided this national monument, illustrious already in other lands, out of their own pockets have largely overpaid all its expenses and erected a magnificent building for its use, and at this day, with a surplus of $264,125 of their money in the hands of the Government, their important business lies neglected month after month, with fees pre-paid and interests often perishing by delay—because other departments have taken possession of the Patent Office building and crowded its legitimate business almost out of it, in a stifling corner where it cannot be transacted.

And this injustice and cruelty are aggravated every day with the increasing activity and beneficence of the inventive genius which is thus encouraged (!) by the United States. The cash received from inventors last year amounted in round numbers to half a million dollars: the application fees exceeded those of 1865 by nearly fifty per cent, while the caveat fees exceeded by nearly two hundred per cent, and the total receipts by more than forty-two per cent! At the present rate it is calculated that the applications the present year will rise to TWENTY THOUSAND. How is the business to be done? Without prompt provision for more room and force it *cannot* be done.

The plain question is: Gentlemen of the Senate and House of Representatives, do you intend to TAX INVENTION, and that retrospectively, for the benefit of the general treasury, or do you intend to give that great element of public welfare simply free and fair play, on paying its own expenses? But taxed or untaxed, inventors claim at least the common rights of men—that when services are agreed on and paid for, they shall be performed and not neglected. Name your price, gentlemen, but in the name of common honesty let the work be done.

MISTAKEN ECONOMY AND POOR MATERIALS.

Every successful manufacturer, particularly the builder of machinery, well understands that it does not pay to employ poor material any more than to turn out poor workmanship; yet it is too often apparent that men will jeopardize their reputations as workmen by using materials whose only advantage is a slightly reduced cost. In machinery this practice is reprehensible, for not unfrequently life as well as property is at stake, and not always is the end desired—diminished cost—reached, the poor material sometimes being really no cheaper than a better quality. The saving effected by the use of cast iron crank shafts and connecting rods on a small steam engine is very slight, while the danger of fracture and disaster is great. Strength, lightness, proportion, and durability are all sacrificed to the saving of a few cents or dollars. Even the reputation of the builder is risked and his character impaired for this paltry consideration.

A few days ago we saw a turbine wheel the upper boxes of which were held against the vertical shaft by wedges of cast iron. These wedges were perhaps ten inches long by two and a half wide and one inch thick at the heavy end. Certainly they cost a trifle less than they would if forged from wrought iron, but in moving the machine one of them had broken off and probably the other would follow on the next removal. The purchaser would be compelled to replace them by forged wedges or wooden ones, which really would be preferable to those of cast iron. The shafts of grindstones for shop and farm use may be well enough, if properly proportioned, made of cast iron, but who would not be willing to pay more for one forged from tenacious wrought iron? Many who purchase such articles do not know the difference between wrought and cast metal, and it is these who are imposed upon. Their confidence in the dealer or the maker once shaken, they shun them thereafter, and then the maker or seller suffers.

Undoubtedly there are many cases where cast iron is fully equal to wrought, where either may be used, but the practice so common of substituting the inferior material for that best adapted to the work to be done is carried to a ridiculous extent, sometimes the extra work on the inferior article making its cost fully equal to that of the better material. There can be no true economy in this, and neither is it good economy to pursue this plan even when a trifle of the first cost may be saved. Sooner or later the wares of such workmen become a drug in the market, while the conscientious manufacturer will in time build up a reputation which will prove of more value to him than his money capital.

The market is full of miserable counterfeits "made to sell." So-called plated ware, revealing the base material before the gloss of newness has disappeared; brass jewelry, corroding at the first touch of moisture; tin ware, thin as vanity and soon eaten through and through; wooden ware gaily painted with evanescent water colors to go at the first handling; indeed, so common has become the practice of employing poor materials that it is absolutely difficult to obtain a good article, as tin ware, for instance. Surely a reform is needed, and he who will in any of these departments of industry manufacture and put into the market a really good article at a fair price and profit, will find a return in the support of an appreciative and humbug-ridden public.

"OZONE."

This is one of the comparatively recent articles in the repertory of science, having been introduced thereto only about twenty-five years ago. As its name is more and more frequently occurring in chemical notes and disquisitions, to the mystification of most persons not professionally read in such matters, it has seemed good to us that the lay readers of the SCIENTIFIC AMERICAN should not be any more mystified in the matter than are the *savans*; and that is undertaking to give them only a very little knowledge indeed, with perhaps a slight addition of plausible conjecture.

That which may be said of this important but obscure substance, is included under three divisions—its history, its nature, and its uses. It was discovered by Schönbein, who named it from the Greek participle ozōn, *smelling*, by which property it first announced itself to us. The peculiar odor, like sulphur or phosphorus, attendant upon a copious evolution of electricity, natural or artificial, had been observed to be attended also by certain chemical effects, such as the decomposition of iodide of potassium. In 1840, Schönbein announced that precisely the same evidences of a mysterious chemical agent appeared at the positive pole of the battery (if of platinum) when water was decomposed by electricity, and moreover that he had intercepted the agent and confined it in a bottle. Ten years later, he had discovered that it was evolved in the slow combustion of phosphorus and of ether, and might be detected in the atmosphere as the result of electric changes. Faraday took it up, and subjected its supposed properties to a strict test by first passing it through a solution of potash to arrest any possible acid which might have been the chemical re-agent, and finding the chemical effect still the same, established its distinct character beyond suspicion.

We will describe the usual test, by which any one may measure the indications of ozone in the atmosphere at a particular locality or season, and thus obtain important evidence, perchance, on the question of salubrity. A strip of soft unsized paper, or muslin, after being starched in the common way, is dipped in a solution of iodide of potassium. No substance common in the atmosphere, except ozone, attaches itself to potassium energetically enough to break its union with iodine. But wherever the test paper is exposed to the influence of ozone, the potassium is attracted and united to the latter, so that the iodine is set free, and its native violet color appears in the starch, which first turns brown, and on being moistened shows different shades, from pinkish white and iron gray to blue, according to the amount of ozone in action. A standard chromatic scale, covering ten degrees of color, has been made, with which the tints of the wetted test paper may be compared, and the relative proportions of ozone in the atmosphere thus measured.

The wonderful delicacy of this chemical action is realized by considering that the characteristic odor is perceptible when the air inhaled contains but $\frac{1}{50000}$ part of ozone, and yet the four lower shades of the test, at least, are obtained from the ordinary odorless atmosphere! This effect from such inappreciable quantities suggests also the marvellous power of the agent, which impresses us still more forcibly on finding that (if we may credit a statement we have seen) an intermixture of $\frac{1}{5000}$ part of ozone in atmospheric air renders it quickly fatal to animals breathing it. To the human respiratory organs it is highly irritating, and produces catarrh, in proportions far below the "smelling" point, and this, with its presence in all wholesome air, seems to intimate that it may be the true excitant of animal life.

To our second inquiry—what is it?—chemistry as yet answers vaguely. At first it was supposed to be a new element, afterward a superoxide of hydrogen, and it has been settled but lately that oxygen is another of those substances, as carbon and boron, which exist in a trinity; ozone being one extreme, antozone the opposite, and the common form of oxygen, the mean. In the peroxide of barium, for instance, it is found that the metal has been oxidized or rusted by ozone; while in the peroxide of manganese there appears evidence of antozone, or an oxygen which acts differently from both that combined with barium and that found in air or water. The most remarkable indication of the nature of this element, is the fact that pure dry oxygen is entirely converted into ozone by a silent current of electricity, and then, by a continued application of electric sparks, or by a moderate heat of 450 to 500 degrees, it is entirely re-converted to oxygen; as indeed it may be, in whatever manner it has been produced.

Finally, what are its uses? It is oxygen *par excellence:* that king among elements which subdues them to the pur-

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poses of nature and life, exalted by electric force to a hight of aggressive energy which consumes decay and corruption, and seems to attack the sensitive tissue in living organisms with a stimulating power that imparts through every organ the sense of refreshment and invigoration attendant upon the "clearing [ozonizing] of the atmosphere" by a thunder storm. Its gradual disappearance from the atmosphere marks the approach of malignant epidemics, such as Asiatic cholera, and its appearance is the signal for their abatement. Dr. Moffat's observations of the ozone in the atmosphere before and during the cholera epidemics of 1853 at Newcastle and 1854 at London, established these coincidences with the greatest precision. The south wind that springs up at length, after such a stagnant and sickly season, and brings what we call purifying thunder showers, is proved to be an ozonized wind, and directly the starched paper in the wind feels the action of the liberated iodine and begins to change color, the epidemic begins to abate.

The putrid matter that may be collected from the exhalations of animal or vegetable decay, a very little of it, will kill a dog. The only conceivable way to neutralize this poison in its aëriform state (at least, without suffocating all creatures that breathe) is to oxidize it by the wonderful energy of an imperceptible ingredient of ozone. Its action, when it comes on the life-giving wind, is instantaneous, universal, and complete. The air of regions proverbially healthy, as highlands and seacoasts, and wherever the circulation of the atmosphere has freest course, is found to be the most abundantly charged with ozone. Its presence gives the night air its stimulating power, so much courted by writers and lovers of pleasure. The exhilarating breath of winter is laden with it above all seasons of the year except that of May; and autumn, when all nature begins to decline, parts with the ozone until its minimum is reached in cheerless November. What shall we do to woo back this Life-Angel, in the time and place of mortal need? We know how to warm a cold place, light up a dark one, moisten a dry one, fertilize a barren one, and provide ourselves in a thousand ways against defect or excess of the elements, and must advancing science still leave us dependent helplessly on the movements of nature for vital air?

VOLUNTARY POLICE ASSOCIATION.

The Society for the Prevention of Cruelty to Animals has indirectly extended its beneficence to a class of creatures whom railroad men at least appear to regard as strictly within the scope of its terms—the animal Man. The bill offered by the society to the legislature of New York, forbidding two-horse omnibuses to carry more than twelve, and two-horse cars more than twenty-four passengers, is a measure of mercy to man and beast.

We hope this kind of good work may go on, and branch into various development. Even in strongly governed European countries, it is found that many outrageous abuses, not directly taking life or property, can be brought to the bar of justice only by voluntary police association. In this country we are full of such abuses. We are strangers to the sensations associated with clean and orderly streets, unobstructed sidewalks, regulated and responsible public service, from government down to common carriers, and a hundred other things which older governments recognize among the ends of their existence, and "subjects" expect as their unquestioned right.

The London Street Reform Society has just issued its prospectus, proposing to collect and publish facts, expose abuses, agitate reforms, enforce and improve existing regulations, and take a general oversight of street arrangements, vehicles, traffic and sanitary matters. Such a society would find a magnificent field of public beneficence in the city of New York. We have our Citizens' Association, it is true, which has done and is doing incalculable good: but there is only too much room for others of less general character, besides the humane society to which we at first alluded. It seems evident that henceforth voluntary associations for public improvement and reform are to be the medium for the public spirit of our more thoughtful and influential citizens. They owe a participation in local public affairs, both to themselves and the public, and happily this way of getting at it is as effective as it is personally unobjectionable. Through such mediums they constitute themselves a "third house" to the legislature, and at the same time a third arm to the executive.

We should like to see an able, influential, deliberative and resolute street-reform society. Such a body might examine the subject of street franchises from top to bottom—from the highrailwaymen who claim to own the roadways in fee simple, down to the packing-box gentry, auctioneers, hucksters, builders, ash-boxes, etc., that maintain their "nine parts of the law" by immemorial custom on the sidewalks. Who knows but that the popular and legislative mind might in time be educated up to the principle that highways and all their appurtenances are naturally public property and must ultimately be free to all, for their proper purposes and therefore for no other?

Influence of Sound upon Flame.

Prof. Tyndall's recent experiments upon "sounding and sensitive flames," to which we referred last week, open a very interesting line of inquiry. Every one may have observed that a slack current of incandescent gas goes up from its outlet in slow combustion and smoke, with a diminishing diameter and a sluggish, wavy vibration, to a considerable relative hight, not apparently obstructed by the resistance of the atmosphere. On the other hand, a jet of the same gas under pressure impinges upon the atmosphere with a velocity which causes it to be thrown back and shortened vertically and widened horizontally, while its combustion is intensified, its brilliancy hightened, its smoke consumed, and its vibrations grow more violent—that is, become coincidently accelerated and shortened—as the velocity of the jet is increased by pressure, until they produce a roar. As the velocity further increases, the roar rises in pitch, and the vibrations are so intensified as to render the flame comparatively fixed and steady. If the jet be confined in a tube or lamp chimney, its velocity relative to the air is increased by the draft of the air through the tube, and the effect is in some respects similar to that of pressure, but its vibration may be so modified as to produce a tense, defined or musical sound. This naturally seems to be the result of embodying the vibration (so to speak) in a fixed and firm medium, the tube, from which it is given in definite and uniform waves to the external atmosphere. But the experiments of Prof. Tyndall suggest that the reflection of the vibration from the tube to the flame is the essential means, operating to re-inforce as well as to steady the primary vibrations to the sounding pitch: while the length of the inclosure gives them length, as well as a longitudinal current and impetus (as in the discharge of a shot through a tube) to sustain their passage or rather prolongation through the air. The evidence is this—and here is the fact of which Prof. Tyndall's curious experiments are phenomena—that the vibrations of a flame are re-inforced by coincident vibrations from other sources, as musical instruments and other onorous objects, receiving an increase of energy which is manifested alike in the volume and sound of the flame. For instance, a jet in a tube, which is not up to the pitch of sonorous energy by itself, may be instantly re-inforced in its vibration either by the right note from any foreign substance or by changing its position in the tube, at once begins to sound the same or a harmonious note, and when thus started will continue to sound. At the same time, the extension of the flame is contracted by the re-inforced vibration, in a similar manner as by increased pressure, and sudden, *i. e.* short sounds, produce the short effect called a start or jump, in the flame. We quote the further effects exhibited in Prof. Tyndall's late lecture:—

Pass a steadily-burning candle rapidly through the air, you obtain an indented band of light, while an almost musical sound heard at the same time announces the rythmic character of the motion. If, on the other hand, you blow against a candle flame, the fluttering noise produced indicates a rythmic action. When a fluttering of the air is produced at the embouchure of an organ pipe, the resonance of the pipe re-inforces that particular pulse of the flutter whose period of vibration coincides with its own, and raises it to a musical sound. When a gas flame is introduced into an open tube of suitable length and width, the current of air passing over the flame produces such a flutter, which the resonance of the tube exalts to a musical sound. Introducing a gas flame into this tin tube three feet long, we obtain a rich musical note; introducing it into a tube six feet long, we obtain a note an octave deeper—the pitch of the note depending on the length of the tube. Introducing the flame into this third tube, which is fifteen feet long, the sound assumes extraordinary intensity. The vibrations which produce it are sufficiently powerful to shake the pillars, floor, seats, gallery, and the five or six hundred people who occupy the seats and gallery. The flame is sometimes extinguished by its own violence, and ends its peal by an explosion as loud as a pistol shot. The vibrations consist of a series of partial extinctions and revivals of the flame. The singing flame appears continuous; but if the flame be regarded in a mirror which is caused to rotate, the images due to the revivals of the flame are separated from each other, and form a chain of flames of great beauty.

A flame may be employed to detect sonorous vibrations in air. Thus, in front of this resonant case, which supports a large and powerful tuning-fork, I move this bright gas-flame to and fro. A continuous band of light is produced, slightly indented through the friction of the air. The fork is now sounded, and instantly this band breaks up into a series of distinct images of the flame. In this glass tube fourteen inches long, a flame is sounding: I bring the flat flame of a fish-tail burner over the tube, the broad side of the flame being at right angles to the axis of the tube. The fish-tail flame instantly emits a musical note of the same pitch as that of the singing-flame, but of different quality. Its sound is, in fact, that of a membrane, the part of which it here plays. Against a broad bat's-wing flame I allow a sheet of air, issuing from a thin slit, to impinge. A musical note is the consequence. The pitch of the note depends on the distance of the slit from the flame.

Before you now burns a bright flame from a fish-tail burner. I may shout, clap my hands, sound a whistle, or strike an anvil; the flame remains steady and without response. I urge against the broad face of the flame a stream of air from the blow-pipe. The flame is cut in two by the stream of air. It flutters slightly, and now when the whistle is sounded the flame instantly starts. A knock on the table causes the two half-flames to unite and form for an instant a flame of the ordinary shape. By a slight variation of the experiment, the two side-flames disappear when the whistle is sounded, and a central tongue of flame is thrust forth in their stead. Passing from a fish-tail to a bat's wing burner, I obtain this broad steady flame. It is quite insensible to the loudest sound which would be tolerable here. I turn on more gas: the flame enlarges, but it is still insensible to sound. I enlarge it still more, and now a slight flutter of its edge answers to the sound of the whistle. Turning on a little more gas, and sounding again, the jumping of the flame is still more distinct. Finally I turn on gas until the flame is on the point of roaring, as flames do when the pressure is too great. I now sound my whistle; the flame roars and thrusts suddenly upwards eight long quivering tongues. I strike this distant anvil with a hammer, the flame instantly responds by thrusting forth its tongues. Another flame is 18in. long, and smokes copiously. I sound the whistle; the flame falls to a height of 9in., the smoke disappears, and the brilliancy of the flame is augmented. Here are two other flames. The one of them is long, straight, and smoky; the other is short, forked and brilliant. I sound the whistle; the long flame becomes short, forked and brilliant; the forked flame becomes long and smoky. As regards, therefore, their response to the sonorous waves, the one of these flames is the exact complement of the other. Here are various flat flames, 10in. high, and about 3in. across at their widest part. They are purposely made forked flames. When the whistle sounds, the plane of each flame turns ninety degrees around, and continues in its new position as long as the whistle continues to sound. Here, again, is a flame of admirable steadiness and brilliancy, issuing from a single circular orifice in a common iron nipple. I whistle, clap my hands, strike the anvil, and produce other sounds, the flame is perfectly steady. Observe the gradual change from this apathy to sensitiveness. The flame is now 4in. high. I make its hight 6in.; it is still indifferent. I make it 10in., a barely perceptible quiver responds to the whistle. I make it 14in. high, and now it jumps briskly the moment the anvil is tapped or the whistle sounded. I augment the pressure, the flame is now 16in. long, and you observe a quivering which announces that the flame is near roaring. I increase the pressure; it now roars, and shortens at the same time to a height of 8in. I diminish the pressure a little; the flame is again 16in. long, but it is on the point of roaring. It stands as it were on the brink of a precipice. The whistle pushes it over. Observe it shortens when the whistle sounds, exactly as it did when the pressure was in excess. The sonorous pulses, in fact, furnish the supplement of energy necessary to produce the roar and shorten the flame. This is the simple philosophy of all these sensitive flames.

Here, again, is an inverted bell, which I cause to sound by means of a fiddle-bow, producing a powerful tone. The flame is unmoved. I bring a half-penny into contact with the surface of the bell; the consequent rattle contains the high notes to which the flame is sensitive. It instantly shortens, flutters, and roars, when the coin touches the bell. Here is another flame 20in. long. I take this fiddle in my hand, and pass a bow over the three strings which emit the deepest notes. There is no response on the part of the flame. I sound the highest string: the jet instantly squats down to a tumultuous bushy flame, 8in. long. Some of these flames are of marvelous sensibility; one such is at present burning before you. It is nearly 20in. long; but the slightest tap on a distant anvil knocks it down to 8in. I shake this bunch of keys or these few copper coins in my hand; the flame responds to every tinkle. I may stand at a distance of 20 yards from this flame: the dropping of a sixpence from a height of a couple of inches into a hand already containing coin, knocks the flame down. I cannot walk across the floor without affecting the flame. The creaking of my boots sets it in violent commotion. The crumpling of a bit of paper, or the rustle of a silk dress, does the same. It is startled by the plashing of a raindrop. I speak to the flame, repeating a few lines of poetry; the flame jumps at intervals, apparently picking certain sounds from my utterance to which it can respond, while it is unaffected by others. In our experiments down stairs, we have called this the vowel flame, because the different vowel sounds affect it differently. I utter the words boot, boat, and beat in succession. To the first there is no response; to the second, the flame starts; but by the third and fourth it is thrown into violent commotion; the sound Ah! is still more powerful, the vowel sounds characterised by the sharpest overtones being the most powerful excitants of the flame. If the most distant person in the room were to favor me with a "hiss," the flame would be instantly shivered into tumult. This hissing sound contains the precise elements that most forcibly affect the flame. The gas issues from its burner with a hiss, and an external sound of this character added to that of a gas-jet already on the point of roaring is equivalent to an augmentation of pressure on the issuing stream of gas.

An Alloy which exhibits a golden yellow color, is readily forged like iron, and easily worked by the file, consists of 4·06 parts iron, 55·33 parts copper, and 41·8 parts zinc

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MARCH 5, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

62,517.—Apparatus for Washing Fibrous Substances.—William Adamson, Philadelphia, Pa.

First, I claim the use for washing fibrous material of two troughs and one supply of water, which first passes into and through the trough where the last washing is conducted, and thence into the trough where the first washing takes place, all substantially as set forth for the purpose specified.

Second, The adjustable pipe, j, arranged for the withdrawal of the dirty water from the trough beneath the perforated shield, F, substantially as described.

Third, The trough, B, with its rollers, P.

Fourth, The combination of the said rollers, P, with the endless band, T, of slats

Fifth, The endless band, T, in combination with the rollers, y y.

62,518.—Sand Emery and other like Paper.—William Adamson, Philadelphia, Pa.

I claim sand or emery paper saturated with a solution of gum elastic or gutta percha and naphtha, or other equivalent solvent, and for the purpose described.

62,519.—Peat Machine.—Edward Atkinson, Brookline, Mass.

First, I claim the combination of plowshares, a, cutting blades c, and conical screw, constructed and arranged to operate substantially as and for the purpose set forth

Second, The yielding or expanding outlet or delivery tube, arranged to operate substantially as and for the purpose set forth.

62,520.—Button-hole Sewing Machine.—W. B. Bartram, Norwalk, Conn.

First, I claim reciprocating the plate, E, on a straight line, at right angles to the line of movement of the forward feed by means of the switch cam, A, switch, B, and jog bar, D, constructed, arranged, and operating as and for the purpose set forth.

Second, In combination with the sewing mechanism of a "Wilcox and Gibbs" sewing machine, the switch cam, A, switch, B, arm, C, jog bar, D, or their equivalents, and the plate, E, for the purpose set forth.

Third, The combination of the switch cam, A, switch, B, switch bar, C, and jog bar, D, substantially as and for the purpose set forth.

Fourth, The combination of the switch, B, jog bar, D, shoulder, I, and set stop screw, H, or its equivalent, for the purpose set forth.

Fifth, The combination of the switch, B, and jog bar, D, with the set screw, H, stud, L, or their equivalents, for the purpose set forth.

Sixth, The feeding dog, O, pivoted to the feed bar, as described, in combination with the reciprocating plate, E, substantially as and for the purpose set forth.

Seventh, The guide plate, U, in combination with the straining slide, W, and the serrated plates, V V', substantially as and for the purpose set forth.

62,521.—Composition for Building Material.—Sylvester Bissell, Hartford, Conn.

I claim a composition for building materially as and in the proportions described.

62,522.—Feed Rack.—John W. Blanchard, Rutland, Wis.

I claim the arrangement of the board, n, for conveying the feed, and the roof boards, o and p, opening in the manner described, in connection with the rocks, e and f, and trough, g, for the purposes described.

62,523.—Barber's Chair.—N. W. Bonney (assignor to himself and O. Davis), Lewiston, Me.

I claim the frame, b c, having the arm, h, projections, e, and pivots upon which the same is made to swing, as described, in combination with the spring, g, constructed as set forth, all arranged and applied in the manner and for the purpose specified.

62,524.—Horse Rake.—William L. Bostwick, Ithaca, N. Y.

First, I claim the combination of the three-forked lever, I, connecting rod, H, and hand lever, G, substantially as and for the purposes set forth.

Second, I claim the pressure bar, F, provided with the hanging staples, P, three-forked lever, I, connecting rod, H, and hand lever, G, all arranged and operating materially as and for the purpose set forth.

62,525.—Hand-pegging Machine.—J. Hamilton Brown, Watertown, Mass.

I claim, First, Operating all the moving parts of the machine, as well as the machine itself, when periodically fed along or over the shoe, from a single cam shaft, by which said movements are timed and regulated, substantially in the manner and for the purpose set forth.

Second, So combining and arranging an awl and peg driver as that both shall operate in a vertical line without lateral motion, and through separate holes in a nose piece at the base of the machine, and at separate times, by means of cams and springs, so arranged that the greatest resistance or force of the separate springs shall not be exerted at the same time, substantially as and for the purpose herein set forth.

Third, Feeding the machine over the shoe, and cutting off the peg from the strip or bolt of the peg wood by one and the same vibrating instrument, so that these two operations may be perfectly timed and regulated as and for the purpose set forth.

Fourth, The feeding mechanism for moving the machine over, on, or around the shoe or boot, composed of foot, through which a nose piece furnished with separate holes for the awl and peg driver, passes, in combination with a pivoted lever and point working through the awl hole to draw the machine along, substantially as described.

Fifth, Moving back or setting the feeding device preparatory to its feeding the machine along, and whilst the awl is in the sole, and allowing the feed to take place after the awl is withdrawn from the sole and is still rising, so that the force exerted in withdrawing or raising the awl shall aid in bringing the feeding foot close to the sole, and thus by impact make the feed more certain and accurate, substantially as described.

Sixth, The arrangement by which the feeding of the machine along the sole takes place after the awl hole is made, and before the peg driver descends substantially as and for the purpose described.

Seventh, The arrangement by which the driving of the peg takes place whilst the awl is ascending, and the machine close down upon the sole, so that the peg shall be driven entirely down, and not project above the surface of the sole, substantially as and for the purpose set forth.

Eighth, Combining with a portable hand-pegging machine that moves around the boot or shoe that is being pegged by it, a cup or box for carrying around with the machine a bolt or coil of peg wood that is fed into the machine by drawing upon the end of the strip or ribbon, and without the use of any pushing device, substantially as described.

62,526.—Toilet Glass.—Robert H. Brown, Detroit, Mich Antedated Feb. 20, 1867.

I claim the combination and arrangement of glass, 3, the folding frame, 2, and the folding glass, 1, operating as and for the purpose specified.

62,527.—Metallic Stuffing Box Packing.—Joseph F. Chuse, Litchfield, Ill.

First, I claim the packing, b, and its enclosing casing, b2, when constructed substantially as and for the purpose set forth.

Second, The combination and arrangement of the packing rings, b and b2, and the spring, c', substantially as set forth.

Third, The packing rings, b b2, in combination with enclosed perforated casing, B, substantially as set forth.

Fourth, The packing rings, D D', when constructed and arranged substantially as set forth.

62,528.—Twine Cutter.—James Madison Clark, Chester, Conn.

I claim the knife, K, in combination with the tongue, I, and spring, S, for the purpose herein set forth.

62,529.—Washing Machine.—H. C. Covert, Fayette, N. Y. Antedated Feb. 23, 1867.

I claim, in combination with the rubbers, B C, having opposite reciprocating motions, and having plane rubbing surfaces, the arrangement of the jointed arms, a h, and levers, k, made to be inserted or removed from the box at pleasure, by means of the bearings, n, and buttons, o, the whole arranged and operating as herein set forth

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62,530.—PAPER CUTTER.—Cyrus Cropper, Cincinnati, Ohio.

First, I claim the knife operated laterally to and fro at the same time it is descending, by means of a cam or eccentric working in a slot in one end of the knife bar, substantially as and for the purpose herein set forth.

Second, The rack and pinion for the purpose of drawing down and raising the knife, substantially as herein set forth.

Third, The adjustable joint, a, in the rod, O, for the purpose of regulating the position of the knife, C, substantially as herein set forth.

62,531.—CLOCK ALARM.—John Decker, Sparta, N. J., assignor to himself and Charles W. Wardwell, Brooklyn, N. Y. Antedated March 1, 1867.

I claim the spring with cylinder attached, in connection with the cord and weight, all arranged so as to be capable of being applied to a clock to operate substantially in the manner and for the purpose specified.

62,532.—DOOR FASTENING.—John Decker, Sparta, N. J., assignor to himself and Charles W. Wardwell, Brooklyn, N. Y. Antedated Feb. 20, 1867.

I claim the door fastener herein described, the same consisting of the rod, A, spurs, a a', semi-circular continuation, B, continuations, C and D, constructed and operating substantially as described for the purpose specified.

62,533.—BUCKLE.—Thomas B. De Forest, Birmingham, N. Y.

I claim the combination of the clasp, B, constructed with the slot, d, and bar, f, with the frame, A, when the clasp, B, is above and the bar, f, below, or vice versa, so that the strap or band drawing against the bar, f, draws the clasp, B, upon and so as to hold the strap, substantially in the manner herein set forth.

62,534.—FRAME FOR SUPPORTING STOVES ON VESSELS.—A. M. Duburn and J. Keith, Chicago, Ill.

We claim the combination of the standards, B, suspenders, C, platform, E, and arms, H, substantially as and for the purpose set forth.

62,535.—SNOW SCRAPER FOR LOCOMOTIVES, ETC.—C. C. Elliott, Esconawba, Mich.

I claim the springs, C, arm, D, and notched bar, E, and spring, F, in combination with the scraper-carrying shaft, B, when applied and operating substantially as described for the purpose specified.

62,536.—ATTACHING STOPPERS TO BOTTLES.—John J. Echleman (assignor to himself and James Riley), Philadelphia, Pa. Antedated Feb. 16, 1867.

I claim an expanding or elastic ring, D, and a chain, a, in combination with the stopper, B, substantially as and for the purpose described.

62,537.—MACHINE FOR CLEANING AND PURIFYING BONE BLACK.—R. Ticken and F. L. Williams, Philadelphia, Pa.

First, We claim the box, B, with its diaphragm screen, K, openings, g and d, in combination with the blower, E, and trunk, I, when constructed and arranged substantially as described.

Second, We claim the dust-collected boxes, M and N, constructed and arranged substantially as described.

Third, We claim the combination of the blower, E, diaphragm box, B, trunk, I, and collecting boxes, M and N, constructed and arranged substantially as described.

62,538.—FILTER.—Henry Flad, St. Louis, Mo.

I claim my improved filtering apparatus, constructed of a removable feed tube, c, and inclined or convidal supporting plate, b, a removable feed reservoir, B, and outer inclosing vessel, A, combined and operating substantially in the manner herein set forth.

I claim also the combination of a check valve, c1, chain and supporting bar, c2, with the upright feed tube, c, of a self-feeding filtering apparatus constructed and arranged substantially as herein described.

I claim, also, syphon, d, and float, z, in combination with feed tube, c, of an improved filtering apparatus, constructed and operating substantially in the manner herein set forth.

62,539.—ICE CRUSHER.—F. F. Fowler, Upper Sandusky, Ohio.

I claim an ice crusher composed of a box, with holes or openings in its bottom, formed by transverse ribs, a follower, guided to work therein, and a lever to operate said follower, the whole being combined to operate substantially in the manner and for the purpose herein described and represented.

62,540.—CRESSET OR BARREL HEATER.—William B. Geddis, Rochester, N. Y.

First, I claim the cresset stove, A, having an air chamber, B, flues, c c, and supply pipe or pipes, b b, for giving the sides of the stove a uniform heating power, in connection with a single smoke pipe, I F'3 F'2 F', f, or e, E F', f, or both, substantially as and for the purpose herein set forth.

Second, In connection with the stove, A, the barrel cover, H, and adjustable pipe, F3, constructed in one piece, and making suitable connection with the section, I, and pipe, F2, substantially as and for the purpose herein specified.

Third, The stove, A B, b c c, pipes, E F F' F2 E3' f, cover, H, and counter balances, K K, all constructed and arranged substantially in the manner and for the purpose set forth.

Fourth, The construction and arrangement of the pipe, F F', F2, and F3, in such a manner as to perform the double office of a smoke pipe and crane as herein set forth.

62,541.—CHILD'S SLEIGH.—Adolph H. Gloss, Philadelphia, Pa.

I claim a board or platform, A, having two parallel runners, in combination with the arms, D D', and their blades, e e, when the latter are inclined as described for the purpose specified.

62,542.—NUTMEG GRATER.—John A. Hooper, South Berwick, Maine.

I claim the combination of the reciprocating cylindrical grater, B C, provided with flanges, a a, the holder, A A', the follower, F, and spring, m, when constructed and operating substantially as and for the purpose specified.

62,543.—SPRING FOR CARIAGE.—John M. and Eugene Ingold, Alleghany, Pa.

First, We claim making elliptic or ellipsoidal springs of one or more leaf or leaves, each leaf extending all around the springs, until its extremities nearly or quite touch each other, so as to form an unbroken curve around the extremities of the major axis of the ellipse, and thus dispense with the welding of the leaf or leaves, substantially as hereinbefore described.

Second, The arrangement of the leaves of an elliptical or ellipsoidal spring, consisting of two or more leaves, and constructed as hereinbefore described, without welding, so that the joint at the extremities of each leaf of the spring shall be lapped or carved by the next contiguous leaf of the spring, the joints of the leaves being alternately placed at a near one or other of the extremities of the inner axis of the ellipse, substantially as and for the purposes hereinbefore described.

62,544.—SWITCH.—Judson F. Jones, Washington, D. C.

I claim the combination of the switch lever, F, cog wheel, E, cogged bar, D, with incline, d, gravitating locking bar, K, removable key, J, and trigger, L, operating as described and represented.

62,545.—DOOR LOCK—Frank F. Landas, Lancaster, Pa.

First, I claim the two-legged twin bolts, one upon the other, held by a pivot, F, each having a raised flange, C and D, and projecting feet, x and y, and c and d, in combination with the double acting spring, e, all arranged in the manner and for the purpose specified.

Second, I also claim the guard chamber, j j, surrounding the keyhole, with its perforations, for the headed pins, z z, in combination with the flanges, c and D, on the lower leg, of the twin bolts, arranged and operating in the manner and for the purpose specified.

Third, I also claim the twin bolt fastener or lever, U, in combination with the prolonged flange, D, on the lower twin bolt, when applied in the manner and for the purpose set forth.

Fourth, I also claim the construction of the key, N, with its projecting pins, n n, in combination with the headed pins, z z, and guard chamber, J j, all arranged and operating in the manner specified.

62,546.—METHOD OF TEMPERING CIRCULAR SAWS.—John Lippincott, Pittsburg, Pa.

First, I claim a plattorm for sustaining circular saws above the floor of the tempering furnace, constructed to support by contact the central portion of the saw, only thus leaving the marginal portion of the saw free from contact with the platform, or with the floor of the furnace, substantially as described.

Second, The iron carriage, constructed substantially as hereinbefore described, for introducing the saw plate into the furnace, supporting and adjusting the same during the process of drawing the temper, and for withdrawing it from the furnace when the tempering process is completed.

62,547.—TWEER.—Daniel S. Loy, Graceham, Md.

First, I claim the valve, E, in combination with the weighted lever, F, and wing, H, substantially as and for the purpose described.

Second, I claim the vibrating wing, H, arranged and supported in the manner described, in combination with the valve, E, and blast pipe, B, as and for the purpose explained.

Third, In a tweer constructed as herein described, I claim the cap plate or shield, K, formed and applied in the manner and for the purpose specified.

62,548.—CLAMP FOR MAKING BROOMS.—H. B. Lyon and G. M. Hopkins, Albion, N. Y.

We claim the screw, B, the follower, D, and the recess, J, in combination with the jointed frame, O, having the slot, F, the screw, K, and the clamp, G, as and for the purpose specified.

62,549.—HOISTING MACHINE.—Henry Malley, Chicago, Ill.

I claim the general arrangement and combination of the reverse pulley, 15, standards, i, shaft, o, with the wheels, P Q, tie, n, and shaft, r, when used to operate the ratchet, S, and rack, t, and slide, X, as and for the purpose set forth.

Second, The sectional guides, I, in combination with the cross-tie, H, and elbows, m, substantially as described and set forth.

62,550.—PAPER WEARING APPAREL.—Thomas W. Mann, Holyoke, Mass.

I claim articles of paper wearing apparel, when folded or plaited, and backed or strengthened throughout its entire surface, substantially as herein described and set forth.

62,551.—METHOD OF ATTACHING HUBS TO AXLE BOXES.—Thomas C. Maris, Athens, Ohio.

First, I claim the cap, A, with its ribs, "b b," substantially as above described and set forth in my specification.

Second, I claim the cap, E, in combination with the box, C, and screw thread, as substantially described.

Third, I claim securing the hub to the box, C, by means of caps, A and E, when one of said caps is rigidly attached to the box and the other adjustable substantially as described.

Fourth, I claim constructing the cap, "A," with one or more of its ribs hollow, for the purpose of introducing oil to the spindle, substantially as described.

62,552.—UNITING SCYTHE AND SNATH.—David W. Marston, Lebanon, N. H.

I claim a straight scythe shank when the said shank is connected to the heel of a snath by means of the transversely recessed and slotted plate, A, the shanked ferule, B B, the pivot bolt, C, and the holding bolt, D, substantially in the manner herein represented and described.

I also claim the combination of the transversely recessed and slotted plate, A, and the shanked ferule, B B', with each other, and with the heel of a snath, by means of the pivot bolt, C, and the holding bolt, D, substantially in the manner herein represented and described.

62,553.—SPIKE MACHINE.—William W. Martin, Alleghany City, Pa.

First, I claim the slide clamps, i and i', when used in combination with the dies, 2, on the roll, B, as herein described, and for the purpose set forth.

Second, The friction roller, e, when used in combination with the side clamps, i and i', as herein described, and for the purpose set forth.

Third, The flanges, J and X, on the roll, C, when used in combination with the roll, B, and slide clamps, i and i', as herein described, and for the purpose set forth.

62,554.—HOOK AND EYE.—James B. Martindale, New Castle, Ind.

I claim the hook, A, when constructed and arranged to operate in combination with the eye, B, substantially as set forth.

62,555.—PENCIL POINT PROTECTOR.—George Merritt, New York City.

First, I claim the metal piece, A A1 A2, and the spring, B, adapted to operate together upon the end of an ordinary wood pencil, substantially as and for the purpose herein specified.

Second, I claim the combination of a rubber eraser, D, with the metallic portion, a a1 a2, so as to give the proper crasive property to the exterior, and also to contribute by its contractile force to the clasping of the metallic portion upon the wood of the contained pencil, substantially as herein specified.

Third, I claim the scalloped and flaring mouth, a b, on the wings, A1 A2, of the metallic pencil point protector, substantially as herein specified.

62,556.—STEAM ENGINE.—John H. Mills, Boston, Mass.

First, I claim the combination with a series of sectional boilers, of the team cylinders, under the arrangement herein described, so that either cylinder alone, or both together, may be used with the full power of steam generated by the said boilers, or so that the smaller cylinder shall exhaust into the larger, substantially as set forth.

Second, The pipe for connecting the two cylinders, arranged so as to pass through the combustion chamber or fire pot of the boilers, substantially as shown and specified.

Third, The arrangement of the boiler, B, consisting of the bent pipe, H, and connecting pipes, c, operating together as shown and described.

Fourth, The arrangement of the inner trunnions of the steam cylinders, in such manner that the steam may pass directly from one cylinder to the other through the said trunnions, as and for the purposes set forth.

62,557.—DAMPER FOR FLAT IRON HEATER.—George R. Moore, Lyons, Iowa.

I claim the application of the damper, D, or its mechanical equivalent to the fire chambers of heaters having an annular chamber for a flue from the fire chamber to the smoke pipe, and substantially in the manner and for the purposes herein set forth.

62,558.—APPARATUS FOR DEFECATING SORGHUM JUICE AND OTHER LIQUIDS.—Daniel B. Neal, Mount Gilead, Ohio, assignor to himself and Kingsland, Allen, & Clark. Antedated Feb. 17, 1867.

Firstly, I claim a series of trays or shallow troughs, B, arranged with one end of each tray or trough deeper than the other, and otherwise constructed so that the fluid fed into the deeper of the topmost trough, will find an exit at the shallow end, and so on through the whole series.

Secondly, I claim the construction and combination of the trays, B, and the windlasses, C c, and C' c', substantially as described.

Thirdly, I claim the reservoir, D, when constructed as herein described, and combined with the trays, B.

62,559.—STOVE PIPE DAMPER.—William V. Perry, Burnett, Wis.

I claim the damper herein described, consisting of plate, A, intermediate between the flange plates, B B, provided with the revolving valve, E, the whole arranged and operating in connection with handle, F, and rod, C, substantially as set forth.

62,560.—COTTON BALE TIE.—Joseph W. Petty, New Orleans, La.

I claim the combination of the two ends of an iron band, when used for banding cotton, when provided with the openings, a b, substantially as described, for the purpose set forth.

62,661.—DIRECTION LABEL.—George E. Pevey, Lowell, Mass.

I claim inserting a fibrous material substantially as described, and for the purposes fully set forth.

62,562.—OILER.—F. P. Pfleghar and William M. Shollhorn, New Haven, Conn.

We claim the method substantially as described, of constructing oilers.

62,563.—INSECT TRAP-LANTERN.—Richard W. Pitman, West Point, Iowa.

I claim an insect trap, composed of a frame work of slats encircling a light, and constructed substantially in the manner and for the purpose herein set forth.

I claim, also, the combination of a water receptacle with the slotted frame work encircling a light substantially in the manner and for the purpose herein set forth.

62,564.—FIRE ESCAPE LADDER.—M. P. Prewitt, Elkton, Ky.

First, I claim a fire escape ladder composed of H, shaped section, jointed or connected together by links, substantially as and for the purposes shown and set forth.

Second, The combination with the top section of the ladder of the combined cross brace, and round or handle projecting from the face of said section, as shown and described.

62,565.—BOLT AND RIVET MACHINE.—John C. Reed (assignor to himself and Samuel E. Hutchinson), Cincinnati, Ohio.

First, I claim the block, R, in combination with the sliding head, Q, cam, C, and screw shanked wedge, S, arranged substantially as described.

Second, The described arrangement of stationary and movable clamp jaws, G and H, cross head, I, toggle, K K k, screw shanked wedge, M, and tightening nut, N, for the purpose set forth.

Third, In the described combination the screw threaped heading gage, 2 the screw shanked wedges, X and 11, and set set screws, v and 12, for adjustment of the length of stroke of the heading punch, substantially as set forth.

Fourth, The arrangement of sliding head, W, knuckle, W, sliding step, 4, and vibrating shoe, 7, substantially as described.

62,566.—MACHINE FOR GRINDING METAL PLATES.—Asa R. Reynolds, Auburn, N. Y.

I claim, First, moving a bed that carries an article to be faced to a grinding stone, upon concave ways, for the purpose of preventing the rounding off of the edge first brought into contact with the stone, as set forth.

Second, I also claim adjusting a bed, at both of its ends, to the wear of a grinding stone by means of the journals and bearings, a b, at one end, and set screw, c, at the other end, substantially as described.

62,567.—MOP WRINGER.—L. F. Rollins (assignor to himself and James Nealey, Jr.,) Bangor, Me.

I claim the wringer, as constructed, with cranked rod, d, the adjustable clamp, e, and connection, b, all constructed and arranged to operate substantially as and for the purposes specified.

62,568.—STEAM GAGE.—Peter Schofield, Philadelphia, Penn.

I claim the detachable disk, D', its elastic diaphragm, F, and cross piece, E, in combination with the outer casing, A, the whole being constructed and arranged as described.

62,569.—CARRIAGE GUARD.—F. B. Shaw, Boston, Mass., assignor to Silas S. Shaw, Bath, Me.

I claim a carriage guard made of india rubber, or its equivalent substance, as and for the purpose specified.

62,570.—SEWING HORSE.—Isaac A. Smith, of Connellsville, Penn.

I claim the adjustable lever, B, provided with the screw, m, and used in connection with the extension, B' and C, of clamping jaws, said lever and jaws being constructed, arranged, and operating substantially as herein described and for the purpose set forth.

62,571.—WASHING MACHINE.—Jost Stengel, Croton, Mich.

First, I claim the pendent wash boards, B', provided with alternate rubbers, D, and spaces, and hinged or pivoted to the shafts, E, in combination with the adjustable rubbers, G, and case, A, arranged and operating conjointly as and for the purpose set forth.

Second, The shafts, B E, and arms, F, in combination with the side pieces, C, rubbers, D G, and case, A, arranged and operating as and for the purpose set forth.

62,572.—MACHINE FOR SHARPENING SAWS.—Charles Taylor, St. Johns, New Brunswick, assignor to himself, James Harris, Bartlett Lingley, and Henry C. Lovell.

I claim a vibrating carriage with a movable fulcrum, in combination with a clamping plate, hinged horizontally to hold the saw and permit it to be turned on edge, with facility, for examination and pointing of the teeth without removing it from the clamping plate.

I also claim the arrangement of the forked lever, x, traversing carriage, z and lever, b, for moving the saw and adjusting it to the grinding stone, substantially as described.

I claim making the fork of the lever, x, adjustable to adapt it to the size of the operator or attendant.

62,573.—WASHING MACHINE.—Jas. Thompson, Vevay, Ind.

I claim the combination of the yielding rollers, B O, fly arms, D, treadle, F, and controlable pressure boards, H, all constructed and arranged to operate as and for the purposes set forth.

62,574.—HOE.—Theodore R. Timby, Saratoga Springs, N. Y.

First, I claim, as an article of manufacture, a hoe with an angular cutting edge, as herein described and represented.

Second, The hook-shaped abutment, C, in combination with handle, B, and hoe, A, as set forth.

62,575.—SASH LOCK.—John B. Tinker (assignor to himself and J. L. Beazan), Buffalo, N. Y.

First, I claim a sash lock having two stops, A A', with cogs or teeth, b, on one end, which mesh with corresponding cogs or teeth, c', made in the case, C, and standing upon an incline, constructed, arranged, and operating in the manner and for the purpose substantially as herein described.

Second, The combination and arrangement of the spring, D, with the stop, A A', in the manner and for the purpose substantially as set forth.

Third, The combination of the projecting pin, h, made on the stops, A A', with a groove, h', made in the case, for the purpose substantially as described.

62,576.—HAND-HOLE PLATE FOR STEAM GENERATORS.—H. A. Towne, Chicago, Ill.

I claim the arrangement and combination of the T-bolt, E, hollow nut, G, and hand-hole cap, C, substantially as described and set forth.

62,577.—HOT-AIR FURNACE.—Charles W. Trotter, Rochester, N. Y.

I claim the peculiar construction of the radiator, e, with center partition, x, the sliding plate, p, and also the damper, w.

62,578.—REVOLVING CHIMNEY TOP.—Frederick Villard, Mt. Eaton, Ohio.

First, I claim the arrangement and combination of the plate, A, constructed substantially as described, with the rods, B, and anchors, C, when used on the masonry of a flue or chimney for the purpose of giving stability to the same, as set forth.

Second, The combination of the spindle, G, and collar, H, with the step, F, and socket, E, constructed, arranged, and operating substantially as and for the purpose set forth.

62,579.—RIB KNITTING LOOM.—Benjamin Wainwright, East Boston, Mass.

I claim the combination, substantially as described, for effecting the endwise movement of the needle frame, B, such combination consisting mainly of the ratchet, D, its series of cams, g g g, or cammed wheel, F, the lever, K, and its pawl, m, the lever, E, the connection rod, G, the spring, N, the weight P, and the arm, I, and its T-piece, M, the whole being applied to the frame, B, its carrier, C, and the loom frame, A, substantially in manner and so as to operate as and for the purpose specified.

62,580.—MACHINE FOR SHRINKING TIRES.—Christopher H. Wakefield, Montpelier, Vt.

I claim the combination as well as the arrangement of the movable carriers, B B, connected as described, and their operative mechanism or rods, o o, with the self-adjusting jaws, d e, cammed lever, C, and the slider, D, the whole being made to operate together substantially in manner and for the purpose as hereinbefore specified.

62,581.—APPARATUS FOR FERMENTING MALT AND OTHER LIQUORS.—Geo. Wallace, Cincinnati, Ohio.

First, I claim the water chamber, D, by which the temperature of the liquor in vats or tanks, A and B, can be regulated during fermentation.

Second, The application of the two-way cock, H, by which the fermentation of each vat or tank may be regulated, or if a surplus amount of gases is generated, allows it to escape through pipes, G.

Third, The open tubs or vat, C, containing water, which allows the non condensing gases to escape, yet prevents the atmosphere from getting in the vats or tanks, A and B.

62,582.—FILTER AND COOLER.—James C. Whitehill, St Louis, Mo.

First, I claim the arrangement of the removable reservoir, A, having a non-conducting bottom, a, the clear water and ice chamber, K, the adjustable tube, B, the joints or coupling, C, and tube, D, the whole constructed and operating substantially as shown and described.

Second, The arrangement of the chamber, K, surrounded by non-conducting material, the removable filter bed, H I, the chamber, E, the tube, D, the coupling, C, the adjustable tube, B, and removable reservoir, A a, the whole constructed and operating substantially as shown and described.

62,583.—OBTAINING OIL FROM PARAFFINE, ETC.—S. Lloyd Wiegand, Philadelphia, Pa.

I claim the process of treating bituminous substances by means of the gases as hereinbefore described or in any equivalent manner and subsequently extracting the oil and paraffine by pressure or displacement in the manner hereinbefore set forth, and described, irrespective of the particular form of the apparatus in which the operation may be conducted.

62,584.—SWAGE.—James Williams and Isaac Short, Amelia, Ohio.

First, We claim a swage consisting of the bed plate, A, fixed anvil, B, movable jaws, C D, and grooves, E e F f, all arranged and operating in the manner here n set forth.

Second, In combination with the anvil, B, and movable jaws, C D, we also claim the bars, C H, cam, I, and springs, K K K' K' or their mechanical equivalents as and for the purpose set forth.

62,585.—CIDER MILL.—Levi Wilson, Springfield, Ohio.

First, I claim the combination with a mill for grinding fruit and a press placed below the same, the intermediate sliding board, K, arranged to operate independently of the motion of the press and substantially as set forth.

Second, The mill for grinding fruit and a press for the same, when the two are built with separate frames, and the mill placed over the press in such manner that the mill frame and mechanism may be moved on the press frame, connecting or disconnecting the mechanism of the mill and that of the press, substantially in the manner set forth.

Third, The arrangement of the adjustable shaft, A, bevel pinion, O, wheel, N' sleeves, N, screw, M, and press heads, L, substantially as set forth.

Fourth, The heads, L, and beds, L', of the press when respectively constructed with corresponding inclined faces and with open slats in each through which the juice may freely flow with the action of the press, substantially as set forth.

Fifth, The combination of the screw, M, intermediate sliding frame' springs, P, and press head, L, arranged to operate substantially in the manner and for the purpose set forth.

62,586.—ATTACHING CARRIAGE THILLS.—Thomas H. Wood, Monroeville, Ohio.

I claim the key, C, springs, D, in combination with the arms, F, wri ts, E, and link, A, constructed and arranged substantially as and for the purpose set forth.

62,587.—BOOTS AND SHOES.—Joseph C. Adams, New London, N. H.

I claim the parts, A B, supporting post, D, and shank, H, made or cast in one piece, in combination with the independent bottom plate, C, as and for the purpose specified.

62,588.—REVOLVING WAIST BLOCK.—Wm. T. Adams, Baltimore, Md.

I claim the waist block sheave, E, journaled within the rotating disk, B, and projecting from its opposite faces for the purpose and substantially in the manner described.

62,589.—ADJUSTABLE RUNNER TO BE ATTACHED TO CHAIRS, ETC.—Alexander Adamson, Washington, D. C.

I claim the construction of the adjustable metallic runners in combination with the sockets and brace rod, to be attached to a chair or small carriage for the purpose herein set forth.

62,590.—PISTON PACKING.—John Askwith, Chicago, Ill.

I claim the ratchet piece, E, the spring, f, and the set screws, h, in combination with the ring, C, as and for the purpose set forth.

62,591.—MACHINE FOR TEMPERING SAWS.—Elias C. Atkins, Indianapolis, Ind.

I claim the sections, H H H H H H, in combination with the sliding bar, G, and bed, I, constructed and operated substantially as set forth.

62,592.—WASHING MACHINE.—Ira Avery, Tunkhannock, Pa.

First, I claim the hollow chambered beater, B, with its adjustable rubbers, m, so applied that portions of the fabric may be contained within the beater while the remaining portions thereof are being subjected to the rubbing and beating action, thereof, substantially as set forth.

Second, The rod i, arranged in a semicircular groove formed in the under side of the bottom bar, h, of the beater in combination with the hollow chambered beater, substantially as herein set forth for the purpose specified.

62,593.—METHOD OF SECURING TIRES ON WHEELS.—Andrew C. Barnes, Albia, Iowa.

I claim the combination of the lug, C, and fellies, B, as described, operating correspondingly with the groove, a, on the tire, A, in the manner substantially as and for the purpose specified.

62,594.—AGRICULTURAL FORK.—Thomas Beale, New Milford, Ill.

I claim a fork for agricultural purposes provided with a supplementa handle, G, applied or attached to the handle, B, by means of a swivel connection, substantially as shown and described.

62,595.—SEED PLANTER.—A. Bennett, Rockford, Ill.

First, I claim the arrangement of the seat, D, the supporting rods, b b, and the covering rollers, c c, combined and operating as and for the purpose described.

Second, The seed boxes, E E, combined with the adjustable feeding slides, i i, the plows, e e, and the levers, l n p, for operating the feeding slides, substantially as herein described.

Third, The shifting concentric rim, w, with the cams, q q, in combination with the rim, w' and the shifting devices connected with them, arranged substantially as and for the purpose herein set forth.

Fourth, The lever bar, H, in combination with the draft pole, G, for raising and lowering the hind end of the frame, A, arranged substantially as and for the purpose herein described.

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62,596.—INSTRUMENT FOR MARKING ANIMALS.—James S. Bodle, Mecklenburg, N. Y.

First, I claim a stamp or brand formed with an adjustable frame, and movable letters combined and arranged to operate substantially in the manner set forth.

Second, The combination of the frame, A A' with lugs, A2 and A3, threaded stem, B2, and notched movable letters, C, substantially as set forth.

62,597.—WOOL PRESS. — Spencer C. Bond, Farmersville, N. Y.

First, I claim a wool press composed of two hinged wings, C, and two sliding heads, G G', in combination with the lever, D, and windlass, H, all constructed and operating substantially as and for the purpose set forth.

Second, The slotted slide, E, with its head, G, in combination with the single slide, F, with its head, G' constructed and operating substantially as and for the purpose described.

62,598.—PAINT.—Henry W. Bradley, New Berlin, N. Y., assignor to himself and B. Van Horn, Bennetsville, N. Y.

I claim, First, As an improved article of manufacture a paint compound which is composed of the ingredients, or their respective equivalents, and in the proportions herein set forth.

Second, The substitution for a certain quantity of oil in paints of boiled rice, substantially as and for the purpose herein set forth.

62,599.—ATTACHING DOOR KNOBS TO THEIR SPINDLES.—Charles B. Bristol, New Haven, Conn.

I claim the use of the inclined plane, g, in combination with the screw, h, and the neck of the knob, A, when they are constructed, connected and made to secure the knob, A, in the desired position on the spindle, substantially as herein described and set forth.

62,600.—CLOTHES DRYER.—Benjamin Britten, Galena, Ill.

I claim the combination of the tubes, A U, with the flanged rings, F T, and arms, G S, as herein set forth for the purpose specified.

62,601.—LUBRICATING DEVICE.—Thomas S. Brown (assignor to himself and John P. Adriance), Poughkeepsie, N. Y.

I claim the chamber, D, in the part, b, of the bearing, C, through which extends the tube, F, communicating with the passage, c, in combination with the plug, E, and journal, A, arranged and operating substantially as herein described and for the purpose specified.

I further claim the plug or stopper, E, of the oil chamber, D, grooved at its under side in combination with the tube, F, and passage, c, in the bearing, substantially as and for the purpose specified.

62,602.—SHAKING TABLE FOR CONCENTRATING ORES.—S. S. Buckminster, Gold Hill, Nevada.

I claim the riffles, b b, running diagonally across the bed of a shaking table in combination with openings, e e, at one end and the adjustable slides, d d, for concentrating gold and other ores, arranged and operating substantially as herein described.

62,603.—FRUIT JAR.—G. W. Buffington, Mechanicsburg, Ohio.

I claim the combination and arrangement of the plate, A, elastic band, E, mouth of jar, D, curved inward so as to form a seat for the cover, A, substantially as herein set forth for the purpose specified.

62,604.—BURGLAR ALARM.—Russell Bunher, Hudson, Wis.

I claim combining an alarm mechanism, substantially as described with a door latch in such manner that by moving said latch the cord, c, will release the trigger, d, from the 'scape wheel and cause the alarm to strike, substantially as herein set forth.

62,605.—WATER WHEEL.—Michael Carpenter, Moscow, Iowa. Antedated Feb. 25, 1867.

In combination with the guides, D, and gates, E, I claim the wheel with the vertical radially-disposed buckets, I, and hub, G, and orifices, K, the parts being severally constructed and the whole arranged for use, substantially in the manner set forth.

62,606.—COMB.—F. A. L. Cassidey, Newnansville, Fa.

First, I claim the side or wing combs pivoted to the ends of the body of the main comb, substantially as herein shown and described and for the purpose set forth.

Second, The combination of springs. C, with the main comb, A, and side combs, B, substantially as herein shown and described and for the purpose set forth.

62,607.—CARRIAGE-AXLE ADJUSTER.—Jonathan Childs, West Troy, N. Y.

I claim a carriage-axle adjusting instrument formed of the bar, G, in combination with the block, F, the adjusting screw, S, with its nut levers, J and K, and the clamps, M and N, substantially in the manner set forth in this specification.

62,608.—METALLIC BLIND-SLAT CLASP AND PIVOT.—George R. Clark, New York City.

I claim the metallic clasp, a, and pivot, h, combined for blind slats, as a new article of manufacture.

62,609.—LIFE-PRESERVING BERTH.—John J. Clyde, Williamsburgh, N. Y.

I claim the combination of the removable berth, D, having keel, d6, and provided with ring bolts, G, line, H, seat, I, and paddle, S, secured to the berth and adjusted to be used for the purposes described when the berth is launched and forms a raft, substantially as specified.

62,610.—COTTON-BALE TIE.—Barry Coleman, Louisville, Ky.

I claim the rectangular tie plate, A, having the square and diagonal-sided slot, a, when applied to bale hoops for securing the ends, arranged substantially as herein described.

62,611.—METHOD OF TREATING HIDES AND SKINS FOR TANNING.—Isaac C. Colton, Buffalo, N. Y., and Albert M. Hastings, Rochester, N. Y.

First, We claim the treating and preparation of hides and skins for tanning by the combined action of hydraulic or hydrodynamic and pneumatic pressure, or by either mode of pressure separately, in combination with rotary motion or internal agitation or movement of the contents or materials to be operated upon while under pressure, by the means and substantially as above described.

Second, The tanning of hides, skins, and leather by the combined or separate use of hydraulic or hydrodynamic and pneumatic pressure in a closed cylinder in combination with rotary motion or internal agitation or movement of the tanning liquors and hides or skins while under pressure, by the means and substantially as above described.

62,612.—METHOD OF BLEACHING AND DYEING YARNS, CLOTHS AND OTHER TEXTILE FABRICS.—Isaac C. Colton, Buffalo, N. Y., and Albert M. Hastings, Rochester, N. Y.

We claim the bleaching and dyeing of cloths, yarns, and other textile fabrics, by the combined or separate use of hydraulic or hydrodynamic and pneumatic pressure in a closed vessel or cylinder in combination with rotary motion or internal agitation or movement of the liquors cloths and fabrics while under pressure, by the means and substantially as above described.

62,613.—CAR COUPLING.—R. A. Cowell, Cleveland, Ohio.

I claim in the draw head, A, formed with an enlarged chamber in the upper part, the hook, c, in connection with the ordinary link and the cam, h, operated by a crank and rods, all constructed and arranged to operate as shown and described.

62,614.—CENTER BOARD FOR SAILING VESSELS.—Washington F. Davis, Boston, Mass.

I claim a center board composed of two or more sections, A B C D, so arranged as to slide within or upon each other in a manner and for a purpose substantially as set forth.

62,615.—SULKY PLOW.—O. P. Dils, Falmouth, Ky.

I claim the arrangement of the draft pole, E, and bars, F C, with the land and furrow wheels, D K, respectively attached, the brace rods, O P, and plow beam, A, for the purpose of forming a new and improved sulky plow, as set forth.

62,616.—LIFTING JACK.—Daniel Diver, Boone, Iowa.

First, I claim an improved lifting jack formed by the combination of the ratchet hook, E, clevis or loop, F, and pivot block, C, with each other and with the lever, B, and fulcrum post, A, substantially as herein shown and described.

Second, The combination of the spring, G, with the pivoted block, C, and fulcrum post, A, substantially as herein shown and described and for the purpose set forth.

62,617.—SHUTTER BOLT.—Benj. K. Dorwart, Lancaster, Pa.

I claim as a new article of manufacture a shutter bolt when composed of two twin plates, A A', each provided with a raised conic flange, B, notched at base for the reception of the horizontal bolts, D D', in the manner and for the purpose specified.

62,618.—WOOD-TURNING LATHE.—Lucius H. Dwelley, Dorchester, Mass.

First, I claim the combination of the shaft, F, with the cam, M, traversing thereon and revolving therewith, lever, 19, and sliding spindle, K, with its tool or tools, substantially as described.

Second, I also claim the combination of the shaft, F, with the cam, J, traversing thereon and revolving therewith, and the vibrating cutter holder, v, with its cutter, u, for the purpose set forth.

Third, I also claim the combination of the shaft, F, with the cam, J, traversing thereon and revolving therewith with the severing cutter, s, as described.

Fourth, I also claim the automatic feed mechanism consisting of the cam, E, rocker arm, D, spring, i, or its equivalent, toothed bar, C, pawl, k, and gage, r, in combination with the traversing carriage, B, when such carriage carries all the tools required to turn, bore, and sever the spool from the stick, substantially as described,

Fifth, I also claim the combination of the auger, 17, slotted cylinder, 21, with its cutter, 22, on its end, and set screw, 24, substantially as and for the purpose set forth.

Sixth, I also claim the mechanism consisting of the groved wheel, s, with its notch, f', and connections, substantially as described, for the purpose of arresting the motion of the cutting and boring tools at a stated position and also to arrest the feed at the same time, substantially as described.

62,619.—COMPOSITION FOR ROOFING.—G. L. and C. H. Eagan, San Francisco, Cal.

We claim the composition for the manufacture of drain pipes, moldings, roofing, etc., the ingredients of which are prepared and combined in the proportions and manner substantially as herein described.

62,620.—BLOWER.—Franz Engel, Camden, N. J.

I claim the screw, C, provided with a jacket, C, at its end and operating in a case, A, from which extends a blast pipe, B, substantially as and for the purpose described.

62,621.—BOOT-CRIMPING MACHINE.—Henry Faus, Hayesville, Ohio.

I claim the iron rods composing the hinge-like arrangement providing for the mobility of the jaws, and the wedge-shaped key and gain cut in each jaw, for the purpose set forth.

62,622.—MEDICAL COMPOUND.—William B. Foster, Ridgeville, Ohio.

I claim the medical compound made of the several ingredients mixed together in or about the proportions, substantially as described.

62,623.—FRUIT GATHERER.—John Frantz of Joseph, Selbysport, Md.

I claim the drum or cylinder, A, provided with grooves, a, and teeth or pins, b, in combination with the finger bars, H, and receptacle, J, all arranged and operating in the manner and for the purpose specified.

62,624.—INSTRUMENT FOR PARING THE HOOFS OF HORSES.—S. D. Freet, McCutchenville, Ohio.

I claim an instrument for paring horses' hoofs, constructed, arranged, adjusted, and made to operate as herein set forth and explained.

62,625.—CAR COUPLING.—Merritt Gally, Marion, N. Y.

First, I claim the tumbler, T T' T", with cams, slots, and lever projections, combined and constructed as herein described.

Second, I claim the catch hook, R, with lever projection, R', in combination with the angular projection, z, of tumbler forming the compound drop latch, Z R, substantially as herein set forth.

Third, I claim the catch tooth, C, in combination with its counterpart mortice, C', substantially as described.

Fourth, I claim, in combination with the tumbler, T T' T", the fulcrum, F, for the purpose herein set forth.

62,626.—MODE OF ATTACHING HANDLES TO TABLE CUTLERY.—Joseph W. Gardner, Shelburne Falls, Mass.

I claim securing handles to forks, knives, or other instruments, by condensing the metal portion of such articles in a groove formed in the handle, substantially in the manner herein described and represented.

62,627.—STOVE-PIPE DRUM.—Geo. H. Hammond, Oneonta, N. Y.

I claim the construction, combination and arrangement of the disks, A E H K L M I F B, with each other, with the interior, intermediate and exterior cylinders, G J D, and with the short pipes, C, substantially as described and for the purpose set forth.

62,628.—CORN CAKE MACHINE.—C. C. Harriman (assignor to himself and John Davis, 3d), Warner, N. H.

I claim the adjustable roller, C, provided with gear wheels, G, slotted supports, D, set screws, E, sliding board, B, cutter, I, beam, J, sliding between the uprights, H H, beam, K, and hand screw, L, when all are constructed and arranged as herein set forth for the purpose specified.

62,629.—MACHINE FOR PEELING WILLOW.—George Healey, East Woburn, Mass.

I claim the combination of a single wheel, a set of stripping jaws, and an endless belt, its supporting rollers, and a deflector, the whole being substantially as described and for the purpose set forth.

I also claim the combination of the two elastic or flexible lips with the single wheel, a set of stripping jaws, and an endless belt, its supporting rollers and deflector, as described.

62,630.—WRENCH.—Sylvester B. Hill (assignor to himself and F. E. Drake), Chicopee, Mass.

I claim a wrench having the jaws, B and C, handle, A, and nut, D, constructed and arranged substantially as herein described.

62,631.—TOBACCO PIPE.—Jean and George Hochapfel, Strasburg, France.

We claim the arrangement of the three passages, A a c, in relation to the bowl, D, none of said passages or openings going through, and all accessible from the outside, and forming passage, trap and nicotine chamber, as set forth and described.

62,632.—BLOCK FORMER FOR MUFFS.—Charles Hollwede and Julius Brzezinsky, New York City.

We claim a muff block composed of several pieces arranged and operated substantially in the manner and for the purpose as hereinbefore set forth.

62,633.—CHURN DASHER.—A. B. Hutchins, Patchogue, N. Y.

I claim the dash, C, consisting of the rim, a, connected by the oblique arms c, to hub, b, and vertical plate, D, with rounded corners, rim, e, and opening, f, and fitted loosely on the rod, B, operating as described, substantially as specified.

62,634.—WATER METER.—H. J. Hyams, New York City.

First, I claim the combination with a fixed crank, S, of the revolving diaphragm measuring chambers, J, constructed and arranged for operation in connection with a foot valve, G, substantially as and for the purpose specified.

Second, The combination and arrangement, substantially as shown and described, of the revolving cylinder with its flexible diaphragms, foot valve and cistern, provided with a valve controlling the head or pressure to the measuring chamber, as herein set forth.

62,635.—CURTAIN FIXTURE.—E. M. Judd, Wolcottville, Conn.

I claim the stock, e, of the pulley, f, having a tooth, i, taking the teeth on the inside of the slide, a, in combination with the sliding clasp, g, for holding said tooth in its place, as set forth.

62,636.—SEALING PADLOCKS.—Zeno Kelley, New Bedford, Mass.

I claim, First, Applying a seal or seals to the end of the shackle suitably constructed therefor, so that to unlock it said seal or seals must be canceled or destroyed by the key, substantially as and for the purpose described.

Second, Constructing the shackle in such manner, in combination with any suitable arrangement of locking devices upon the inside of the lock, that the key for unlocking the lock when inserted therein will pass through the said shackle to break the seals, substantially as and for the purpose described.

62,637.—GATE LATCH.—Wm. H. Kellogg, Du Quoin, Ill.

First, I claim the gate latch, c, in connection with the double bent lever, h h, the friction rollers, k k, and g g, and the spring, f and b, combined, arranged and operated substantially as and for the purposes herein described.

Second, I claim also the latch, c, in combination with the flat spring, b, for swinging and closing a gate, substantially as herein described.

62,638.—WAGON BRAKE.—D. J. Kirkman and E. H. Gray, Winchester, Ill.

We claim the bar, C, in combination with the serrated plate, F, stirrup, e, the rods, k k, the cleat, m, furnished with strap, i, and the bar, S, the whole constructed and arranged and operating as and for the purpose herein set forth.

62,639.—APPARATUS FOR AMALGAMATING GOLD AND SILVER.—Matthew Laflin, Chicago, Ill.

I claim, First, A kettle with partitions dividing it into compartments in the upper part but leaving it open at the bottom, substantially as described.

Second, The method of excluding the air from the lead by means of the covers, one or all of them, substantially as described.

Third, The improved scroll wheel, with one, two or more spiral plates, substantially as described.

Fourth, The screw and its casing, substantially as described.

Fifth, The combination of a scroll wheel and screw, substantially as described.

Sixth, The combination of a scroll wheel, screw and casing, substantially as described.

Seventh, The combination of a kettle, partitions and scroll wheel, substantially as described.

Eighth, The combination of a kettle, partitions, scroll wheel and screw, substantially as described.

Ninth, The combination of a kettle, partitions, scroll wheel, screw and casing, substantially as described.

Tenth, The combination of a kettle, partitions, and cover or covers, substantially as described.

62,640.—TABLE COVER.—Ebenezer G. Lamson, Shelburne Falls, Mass.

I claim a tablefork made of wire substantially as herein described.

62,641.—PLOW.—Ransom K. Laraway and Jarome Laraway, Battle Creek, Mich.

We claim the manner herein described of attaching the frame B', with gang plows attached, to the frame, B, attached to driving wheel, and of attaching to the same, plow, H, as described and set forth.

Second, The manner herein described of raising and lowering the frames, B', with plows attached, or single plow, by means of lever, C', pawl and ratchet, D and E, and flap, n, and chain, g, in the manner set forth and described.

62,642.—SEED DROPPING ATTACHMENT FOR HOES.—A. T. Large, Chicago. Ill.

I claim the seed box, B, with the box, C, attached, and provided respectively with the openings, b d, in combination with the slide, D, placed within the box, C, provided with the opening, c, and operated by the spring, I, and lever, G, all arranged and applied to the handle of a hoe, substantially as shown and described.

62,643.—REFRIGERATOR.—W. Law, New York City. Antedated Dec. 31, 1866.

I claim the construction and arrangement within the walls, A, of the corrugated inclined plates, C, and bottom, H, in such a manner as to prevent the air that rises from the provision chamber, I, from having its moisture condensed by contact with the bottom of the plates, C, and dropping back into the said provision chamber, as herein set forth.

62,644.—LINIMENT FOR CURE OF FOOT ROT IN SHEEP.—Wm. H. Lawes, Somerville, N. J.

I claim a liniment made of the chemical ingredients herein specified and in about the proportions specified.

62,645.—DOOR LOCK.—Adam Leich, Brooklyn, N. Y.

I claim, First, The catches or checks, C F G, applied to opposite sides of the bolt, B, in combination with the partition plate, E, arranged in relation with the bolt and the bar, D, of the catch or check, C, substantially as and for the purpose set forth.

Second, The wards, g, placed in line with or applied to the outer key hole, f, in combination with the partition plate, e, and the catches or checks, C F G, all arranged substantially as herein shown and described.

62,646.—APPARATUS FOR PRINTING ON UNEVEN SURFACES.—Alfred Leighton, London, Eng.

I claim the combined arrangement of a flexible elastic printing surface, a, with a chamber or vessel containing fluid which on being subjected to pressure is caused to act on the printing surface, substantially as described.

62,647.—HOISTING APPARATUS.—A. R. Lemen, Kalamazoo, Mich.

I claim the combination and arrangement of the gear wheels as shown and described, in combination with the frame, when constructed substantially as described and for the purposes set forth.

62,648.—CUFF.—Isaac Levine, New York City.

I claim a cuff, A, provided with spring, B, and elastic retaining cords, a substantially as described.

62,649.—BOOT TREE.—R. L. Lewis, Worcester, Mass.

I claim, First, A boot tree distended by means of a pin b, attached to an arm G, of the stretching rod D, which traverses upon two inclined planes, or slotted inclines, attached respectively to the front and back of the boot-tree substantially as and for the purposes herein shown and described.

Second, A mounted swivelling boot-tree, which is provided with an adjustable heel piece I, substantially as and for the purpose herein shown and described.

Third, The manner of operating the adjustable heel piece, by means of a differential screw i, and plates h h, substantially as herein shown and described.

62,650.—MEDICINE.—Ann Loosley, Philadelphia, Pa.

I claim the combination of the said ingredients, in the said proportions, thereby producing the said medicine, and which I propose to manufacture and sell as "Loosley's Infallible Cure for Whooping Cough."

62,651.—WAGON TONGUE SUPPORTER.—O. Higley, and S. Toothaker, Fredonia, Ohio.

We claim the springs a and c, constructed as described in combination with the tongue or thills C, hounds E E and axle B, for the purposes set forth and specified.

62,652.—MOLASSES GATE.—Theodore Mace, New York, N. Y.

I claim the screw r, passing through the lever e, in combination with the spring d, that surrounds the screw e, and is within a cup on the outside of the gate c, the parts being constructed and applied in the manner and for the purposes specified.

62,653.—BED SPRING FASTENING.—David Manuel, (assignor to Willard Manuel), Boston, Mass.

I claim the cross bar holder c, consisting of the hooks d d, eye or bridge e, hooks g g, and h, constructed as described for the purpose of securing the base of the spiral wire bed spring B, to the slab A, as herein set forth.

62,654.—MODE OF ORNAMENTING MIRRORS.—Thomas C. March, London, Eng.

I claim the ornamentation of mirrors, etc., by affixing to the surfaces of the same by cement, glass knobs, beads, or mouldings prepared by grinding the face to be attached substantially as set forth.

62,655.—STOVE PIPE DAMPER.—Moses S. Marshall, Melrose, Mass., assignor to himself and R. Wendell, Salem, Mass.

First, I claim the combination in a damper of the concave caps B B', central annular plate A, and circular plate C, substantially as and for the purpose set forth.

Second, The combination of the damper spindle and key when said parts are respectively constructed and the whole arranged as and for the purpose set forth.

62,656.—BLIND FASTENING.—W. C. Marshall, New York, N. Y.

I claim the latch e, and releasing lever g, in combination with the self-closing shutter A, constructed and operating substantially as and for the purpose described.

62,657.—LAMP WICKS.—Charles F. Martine, Boston, Mass., assignor to Soletta Oil Company.

I claim the combination of a straight stiffish, hand non-conducting core or thread with the loosely woven wicking used for lamps substantially as and for the purpose described.

62,658.—BOXES FOR HOLDING AND TRANSPORTING BOTTLES.—John Matthews, Jr., New York, N. Y.

I claim the lower extensions or strips E or E', arranged below the upper compartments a, and constructed so as to form shelves or projections, c or c', on opposite sides and to constitute lower compartments, d, in combination with the cross strips forming the upper compartments of the box or case, substantially as specified.

62,659.—MODE FOR PRESSING LEATHER SEAMS.—W. May, Binghamton, N. Y.

I claim the application of a treadle to a machine for pressing leather seams substantially as herein shown and described.

Second, The arm c', on the treadle E, in connection with the spring c and roller C, substantially as and for the purpose herein shown and described.

Third, The spring I, and the manner of regulating its pressure by means of the screw g, substantially as herein shown and described.

Fourth, The rest h, and clamp h', in connection with the pin l, and spring i, made and operating substantially as and for the purpose herein shown and described.

Fifth, The removable "clamp and holder" H, in combination with the fixed supports G, substantially as and for the purpose herein shown and described.

Sixth, The sliding bar F, to which the spring I, is secured when made and operating substantially as herein shown and described.

The rest h, which is so constructed that its lower edge will be parallel with its upper surface substantially as and for the purpose herein shown and described.

62,660.—COTTON CULTIVATOR.—W. McCracken, Bainbridge, Ind.

First, I claim the scraper I, in combination with the plow, the former being placed at the rear of the latter and arranged relatively therewith substantially as and for the purpose set forth.

Second, The connecting of the share F, to the moundboards E, by means of the dovetail arms c, cleats d, and keys e, substantially as described.

Third, The manner of attaching the wheel C, to the beam so that it may be adjusted higher or lower to regulate the depth of the penetration of the plow as set forth.

Fourth, The combination of the hoe O, pivoted rod P, pendant arm i, secured to the coulter bar and cam L, operating in the manner and for the purpose specified.

62,661.—CUTLERY.—Thomas McGrah, Sheffield, Eng.

I claim the securing of handles to the tangs of cutlery by means of sulphur substantially as set forth.

62,662.—COMBINED BRIDLE AND HALTER.—J. McKibben, Lima, Ohio.

I claim the combination and arrangement of the cheek piece G, of the halter, cheek pieces F, of the bridle attached to the rings D, by means of the snap hooks H, nose strap I, chin strap J, brow band A, crown piece B, and throat strap C, as herein set forth for the purpose specified.

62,663.—INVALID CHAIRS.—John N. McMullen, West Liberty, Ohio.

I claim the combination of the shaft F, belt G, toothed wheel A, with its crank b, and pawl e, with seat A, back B, feet rest C, and frame E, substantially as and for the purpose described.

62,664.—COTTON-SEED PLANTER.—J. M. Merrymon, Indianapolis, Ind., and W. M. Dunn, Gurleysville, Ala.

First, We claim suspending the hopper, E, upon a pivot, or its equivalent, so that it may be vibrated for the purpose of agitating the inclosed seed.

Second, Placing the seed hopper of the seeding machine so that the feeding device, passing in at the bottom and out at the top, shall pass vertically beneath the contained seed.

Third, Agitating the seed hopper of the seeding machines by the passage of the feeding device through the same, for the purpose set forth.

Fourth, The cup, M, constructed and attached as described so that in passing over the upper roller, J, the seed will be thrown out as set forth.

62,665.—RETAINER FOR NECK-TIES.—James C. Merritt, New York City.

I claim a retainer for neck ties provided with opening, a a, for the reception of the necktie, and having an elastic connection secured to the retainer by means of lip, F, and provided with the button attachment, e g, substantially as described.

62,666.—APPARATUS FOR PRINTING ON GLASS.—I. L. Miles, Charlestown, Mass.

First, I claim a roller or segment, D, to which are secured curved ways, a a', and a form of elastic type, X, in combination with inking rollers, e e, and a pressure roller, F, or their equivalents, the whole being arranged and operating substantially as and for the purpose described.

Second, The roller or segment, D, with its ways and type, in combination with two or more rollers, h h, substantially as and for the purpose specified.

Third, The adjustable stops or guides, b b, in combination with the roller or segment, D, substantially as and for the purpose set forth.

Fourth, The corrugated bands, F', in combination with, F, for the purpose specified.

Fifth, The roller, J, with its adjustable guides, c c, arranged in respect to the roller, D, substantially as described.

62,667.—BAG TIE.—Levi Morehouse, Barton, Wis.

I claim a clamp with curved arms, one of them slotted or cratched, and supplied with ratchet bar and spring, substantially as and for the purpose herein set forth and described.

62,668.—MOLDING PULLEY.—Wm. Neemes, Pittsburgh, Pa.

First, I claim the box, A, slides, C, and pattern, B, in combination with each other, when constructed and arranged substantially as described and for the purpose set forth.

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Second, The cast-iron case, D, for forming the outer side or face of the pulley, constructed as described, and used in conjunction with the sand molds made in box, A, substantially as herein described and for the purpose set forth.

62,669.—STRIGHTENING RAILROAD RAILS.—Franklin Nelson, Wyandotte, Mich.

I claim the sliding press drop, C, connected by a toggle joint with the crank, d, in combination with the vibrating roller frames, K K, constructed and operating substantially as herein described.

62,670. — APPARATUS FOR DISTILLING AND RECTIFYING SPIRITUOUS LIQUORS.—Marcus Newmann, New York City.

First, I claim the arrangement of the stills, A A', with heaters, B, and pipes, d d' c c', provided with suitable stop cocks, substantially as and for the purpose described.

The condensing chambers, l, and troughs, p, in combination with the pipe, q, and condenser, E, and still, A, constructed and operating substantially as and for the purpose set forth.

The extra injection pipe, t, in combination with the pipe, q, chamber, l, and deflecting plate, o, in said chamber, substantially as and for the purpose described.

62,671.—CORN SHELLER.—L. T. Newell, Springville, N. Y.

I claim, First, The combination of two or more concave wheels similar to G and G' when one or more of said wheels are made with the toothed concave surfaces deeper than the others, substantially as described.

Second, The weighted lever, H, provided with the movable piece, I, pin, K, and apertures, J and L, or the equivalent thereof, substantially as and for the purposes described and in combination therewith, I claim the spring board, P, when constructed and described.

Third, I also claim the shape and general arrangement of the wheels, G and G' by which I combine in one the shelling and gearing teeth.

62,672. — WASHING MACHINE. — Mark Newland, Dayton, Ohio.

I claim the double spring connecting rod, D, rubber, G, provided with rollers, K, grooved posts, E, cord, L, pulley, M, and treadle, O, when constructed, arranged and operating as herein set forth for the purpose specified.

62,673.—SASH SUPPORTER.—George Nimmo, Jersey City, N. J.

I claim, the sash or blind supporter formed of the convex retaining cap, d, and screws, e, combined with the india-rubber block, c, in the manner and for the purposes set forth.

62,674.—STRAW CUTTER. — Harrison Ogborn (assignor to himself and John W. Free), Richmond, Ind.

I claim, First, The adjustable knife, H, attached to the fly wheel in combination with the adjustable guide plate, G, attached to the frame, substantially as and for the purpose set forth.

Second, The combination of the adjustable knife, H, and adjustable guide plate, G, with the inclined plate, A' substantially as and for the purpose set forth.

Third. The eccentric notched cam, N, in combination with the springs, M, having projection, M' substantially as and for the purpose set forth.

Fourth, I claim the cam, G' in combination with the fly wheel, G, and bell crank, K, when respectively constructed and arranged substantially as set forth.

Fifth, The mode of securing the feed hands in their relation to the ratchets by projection and grooves, substantially as and for the purpose set forth.

Sixth, The devices for actuating and adjusting the feed hands by means of the adjustable cam, G, bell crank, K, adjustable feed hands, P and P' and adjustable plate, 2, substantially as described.

62,675.—HOSE COUPLING.—William John Osbourne and G. B. Massey, New York City.

We claim the tube, A, provided with the projecting lip, F, having the groove, n, formed therein, in combination with the tube, B, having the collar, E, provided with the flange, e, thereon when said parts are arranged to operate as and for the purpose set forth.

Securing the hose to the tubes by means of the inclined surfaces and the rings, b, constructed and arranged to operate as set forth.

62,676.—CONSTRUCTION OF HOUSES.—John Park, Joilet, Ill

I claim, First, The ventilators, F, in connection with the box or tube for the purposes and substantially as described.

Second, The bevelled lath when applied in the manner and for the purposes herein shown and described.

62,677.—ADDING MACHINE.—Volney Parks, Fort Wayne, Ind.

I claim, First, The two intermittently rotating disks, C and D, furnished on their peripheries with different series of numbers in combination with each other and with the stationary indices, a, substantially as herein set forth for the purpose specified.

Second, The slides, F G, pawls, H, and ratchet wheels, E, arranged in relation with each other and with the disks, C D, furnished with the differing series of numbers, substantially as herein set forth for the purpose specified

62,678.—DIES FOR MAKING BELLS.—Andrew Patterson, Birmingham, Pa.

I claim the manner herein described of forming bells out of circular sheets of steel by means of the action of a series of dies of different shapes constructed and operating on the material, substantially as described so as to condense or thicken the outer portion of said sheets thus forming the bells with a gradual increased thickness from their apex or center to the base or mouth as described and set forth.

62,679.—MANUFACTURE OF PAINTS AND OTHER COMPOUNDS FROM BITUMINOUS SLATES, ETC.—William F. Patterson, Vanceburg, Ky.

I claim the use of powdered or ground retorted slate with any of the oils, hydrocarbons, or gums, for the purpose of forming a paint, paste, or plastic compound, and this I claim whether other material or colors be mixed with the retorted slate powder or paint, or whether calcined after it is retorted or not, substantially as described.

62,680.—DRAFT PIPES FOR LOCOMOTIVES.—A. Pearsall, Atlanta, Ga.

I claim, in combination with the exhaust pipe, F, and the draft pipe, B, having downwardly projecting lips, D, on its outer face, and opening, C, the upwardly projecting flange, E, on the inner face of the pipe, for the purpose described, substantially as specified.

62,681.—HARVESTER.—James Pine, Troy, N. Y.

I claim the use of an open sleeve upon which is suspended the gearing to drive the knife, and the attachment to hold the cutting apparatus when said sleeve is furnished with journal boxes, substantially as and for the purposes set forth.

I also claim the use of the swinging arm, P, when hinged at its rear end to the projecting portion, l, of the sleeve, and when said arm supports the gearing and cutting apparatus, substantially as described.

I also claim the use of the downward projecting arms or guides, Q Q', and the rearward projecting arm, L, in combination with the open sleeve, substantially as described and for the purposes set forth.

I also claim the combination of the hinge, V, the coupling piece, Y, and the lever, X, substantially as and for the purpose set forth.

I also claim the use of a graduated sector-shaped draught bar, when both the cord or chain and double tree or team are united to it above its pivoted point, substantially as and for the purposes set forth.

62,682.—MACHINE FOR MAKING NAILS.—A. M. Polsey, Boston, Mass.

I claim, in combination with the drawing and shaping die rolls and with the rolls, b c, between which the nail is passed, the movable blocks or pieces, e f, arranged to operate against and straighten the opposite edges of the nail, substantially as set forth.

I also claim, in combination with the rolls, b c, and the edge-straightening blocks, e f, the throat, l, operating in connection with the rolls to straighten the broad faces of the nail, substantially as set forth.

Also, In combination with the rolls, b c, and the straightening mechanism, the die projection, m, operating in connection with the edges of the groove, d, to shear or clip off the rough edges of the nail near the point, and also so formed as to chamfer the end of the nail, substantially as set forth.

Also, in combination with the rolls, b c, and straightening mechanism, the cutter, n, for pointing or finishing the point of the nail, substantially as described.

Also, in combination with the rollers, b c, and the straightening mechanism, the spring, i, for throwing the head of the nail from the groove, substantially as described.

Also, the arrangement of the straightening, chamfering, and cutting mechanism described, so as to automatically co-operate with the shaping and drawing die rolls, h, substantially as set forth.

62,683.—ALARM LOCK.—James S. and Russel Porter, Waterford, N. Y.

We claim, First, The pistol, C, hammer, G, latch, H, and trigger, L, when all arranged and combined within the interior of a lock casing, provided with a cover, G, and plug, F, substantially in the manner and for the purpose described.

Second, The cam, P, substantially as and for the purpose described.

62,684.—MACHINE FOR MAKING HORSE-SHOE NAILS.—Silas S. Putnam and Lucius H. Dwelley, Dorchester, Mass., assignor to S. S. Putnam & Co., New York, City.

First, We claim the combination of the several pairs of revolving dies connected by gearing, and otherwise arranged to operate successively and alternately on opposite sides of a nail blank, substantially as described.

Second, In combination with the foregoing, we claim a device for cutting off the blank, substantially as described.

Third, In nail-making machines, having a series of pairs of revolving dies operating substantially as described, we claim constructing the several pairs of dies, in the form herein described, for drawing down the blank in a rounded form during the first part of the operation and afterwards to the form proper for the nail, as specified.

62,685.—MACHINE FOR MAKING HORSE-SHOE NAILS.—Silas S. Putnam and Lucius H. Dwelley, Dorchester, Mass., assignors to S. S. Putnam & Co., New York City.

First, We claim the combination of the cams, with the spring hammers, constructed and operating substantially as described and for the purpose set forth.

Second, We also claim the rolls, R, and the feed mechanism, constructed substantially as described, in combination with the hammers, F G H I, operating substantially as described and for the purpose specified.

Third, We also claim the mechanism substantially as described, for cutting off the nail without moving the rod from its normal position.

Fourth, We also claim the mechanism, substantially as described, for cutting off the nail, in combination with the hammers, K L M N, and a device for holding them apart and out of the way of the cutters while the nail is being cut off.

Fifth, We also claim the combination with the hammers, K L M N, mechanism for cutting off the nail, feed rolls, R, and furnace, O, operating substantially as described for the purpose set forth.

Sixth, We also claim the hammer or former, N, brought up positively to the nail rod, in combination with the spring hammers, K L M, substantially as and for the purpose set forth.

Seventh, We also claim the cam wheels, F G H I, in combination with the hammers, K L M N, and a device for cutting off the nail, substantially as described.

62,686.—BROOM AND BRUSH HEAD.—George T. Reed, Philadelphia. Pa.

I claim a broom head composed of frame, A B C D, strips, wooden or metallic, a a' and C, and top piece, T, all combined together in the manner and for the purpose above described and set forth.

62,687.—DUMPING WAGON.—Warren Robinson (assignor to himself, J. H. Fairchild, and H. Farrington), Highgate, Vt.

I claim the construction of boxes, A, as herein described, and used with the frame, B B, in the manner and for the purposes herein set forth.

62,688.—CASTING PIPES.—George Rogers, Philadelphia, Pa.

I claim the use of the rings or chills, A A, in the manner and for the purposes described.

62,689.—POCKET-BOOK CLASP. — Henry Ropes, Brooklyn, N. Y.

I claim, in a clasp for purses, pocketbooks, etc., the construction and arrangement of the slot, C, which takes the catch, and catch, A, substantially as described, to allow of automatic expansion and extraction of the purse, in combination with the bar, D, and spring, a, or their equivalent, for locking or fastening the catch, and holding the two parts of the clasp together, the several parts operating substantially as and for the purposes set forth.

62,690.—CHEESE VAT.—O. Sage, Wellington, Ohio.

I claim the arrangement of the valve, U, and rod, 3, in combination with the box, B, in the manner and for the purposes herein specified.

62,691.—RAILROAD RAIL.—Elnathan Sampson (assignor to himself and E. Chamberlain), Lansingburg, N. Y.

I claim, First, The chair rail, A, constructed with its sides, P C, top, a, groove, g, and rib, r, together with the usual base and flanges, substantially as set forth aed described.

Second, The bearing rail, B, constructed with its track face, e, beveled inner edge, i, sides, h h', bearing edge, k, substantially as set forth and described.

62,692.—ANTI-RHEUMATIC COMPOUND.—Jacob Schmoll, New York City.

I claim an anti-rheumatic compound made as described.

62,693.—MACHINE FOR CUTTING THREADS ON BOLTS.—Franzis Schweizer, New York City.

I claim, First, The sliding stocks, N and O, in combination with the lever, P, arranged relatively with the cutters, a and b, operating as described for the purpose specified.

Second, I claim the adjustable lever, P, which is provided with arms, d and e, substantially as and for the purpose herein shown and described.

Third, I claim the elastic sliding rest, g, made and operating substantially as and for the purpose herein shown and described.

62,694.—GRAIN SEPARATOR.—H. H. Seely, Hudson, Mich., assignor to F. Swift, Lenawee County, Mich.

I claim, First, The adjustable shoe bottom, C, rod, b, and perforated plate, a, upon the shoe, arranged and used as and for the purpose herein specified.

Second, The arrangement of the rod, G, lever, H, and rods, J and L, with the shoe for the purpose of giving said shoe three motions or one as may be desired, substantially as set forth.

62,695.—ASH AND SIFTING PAN FOR COOKING STOVES.—Jacob H. Shear, Albany, N. Y.

I claim, First, The sloping plate under the fire chamber, in combination with a closely fitted lifting receiver, having an independently vibrating or oscillating grated bottom for sifting the ashes, substantially in the manner and for the purposes above described.

Second, I claim the detachable lifting receiver with a vibrating or oscillating grated bottom fitted closely to the hearth and to the sloping plate under the fire chamber, for the purposes within described, in combination with the lifting ash pan underneath, to receive the ashes during the sifting of the same.

Third, I claim the detachable receiver with the vibrating or oscillating grated bottom, in combination with the lifting ash pan underneath, and the vacant space or chamber, F, between the receiver and the front of the oven, to give the grate room to vibrate outside of the receiver, substantially as shown and described.

Fourth, I claim the detachable lifting receiver having a vibrating or oscillating grated bottom, constructed in the manner substantially as and for the purpose above described.

62,696.—FILTER.—Frederick Shickle and Evermont Randals, St. Louis, Mo.

We claim the water filter consisting of the annular receiving chamber, E, filtering chamber, D, supply chamber, C, surrounded at its upper part by the partition wall, d d, tube, f f, air tube, g, and mud chamber, B, when constructed and arranged as herein set forth for the purpose specified.

62,697.—STRAINER FOR COFFEE AND TEA POTS.—Michael Simons, Middletown, Conn.

I claim the arrangement and combination of movable strainer, C, with its handle, D, and guides, B, when made of Brittania ware, and attached to and operating on the inside at the base of the spout of a tea or coffee pot, as herein described and for the purposes set forth.

62.698.—CUTTER FOR TRIMMING WALL PAPER.—Henry C. Snow, (assignor to himself and C. C. Laltimer), Princeton, Ill.

I claim an implement or cutter for the trimming of wall or other paper or sheet material, constructed, arranged and operated substantially as herein described.

62,699.—STOVE-PIPE DRUMS.—John G. Sorgen, Kenton, Ohio. Antedated Jan. 10th, 1857.

I claim the deflecting cones F and L, and the frustum of a cone J, arranged in relation to each other and the cylinder A, as set forth.

I also claim making the points of the deflecting cones movable so that they can be swung from the opening in the cone to let the blaze and smoke pass up in the centre of the cylinder.

62,700.—CAR COUPLING.—Ezra Staples and William W. Gould, Skowhegan, Maine.

I claim the drop slide D, carrying the pin C, forked piece F', book E, counter balance G', draw head A, having its bottom plate slotted lug n, bent lever J, horizontal rod k, and handles m m, when all are constructed and arranged as herein set forth for the purpose specified.

62,701.—METHOD OF ATTACHING CORDS TO WINDOW SASHES. —Carlos Swift, Mount Carroll, Ill.

I claim the bed plate a, in combination with the catch plate b, for attaching the cord d, to the sash A, arranged and operating as and for the purposes herein described.

62,702.—KNIFE AND SCISSORS COMBINED.—Chester W. Sykes, Suffield, Conn., assignor to James Moore, H. H. W. Wright, Albert Pickernell, Marshall W. Parker, Richard S. Genness, Daniel Dorr, James A. Kelley, George Ochs, and Clarence E. Wilkins, South Boston, Mass., and Erastus Wilkins, Warner, N. H.

I claim the knife blade B, shield A, in combination with the scissors, when constructed and operating substantially as herein described.

62,703.—MACHINE FOR POLISHING SHEET METALS.—Henry Todd, (assignor to Bridgeport Brass Co.), Bridgeport, Conn.

I claim the combination of the trough and presser B, and C, with the rotating shaft E, arranged to draw the sheet through the scouring surfaces of the trough and presser substantially as specified, also in combination with the same, the removable sleeve G, and reversely rotating shafts E and F, essentially as and for the purposes herein set forth.

62,704. — KINDLING FIRE. — William H. Towers, Boston, Mass.

I claim the use of gas for kindling fires, substantially as herein set forth and described.

62,705.— RESTS FOR SHARPENING SAWS.— Jas. F. Tuder, Philadelphia, Pa.

I claim, First, Combining the rest plate, A, with the standard, B, by means of the joint, a, at or near the plate, substantially as above described, and for the purpose specified.

Second, The combination of the rack, f, on the standard, B, with the rest plate, A, substantially as and for the purpose set forth.

62,706. — MANUFACTURE OF IRON AND STEEL. — Charles Usher, Iowa Falls, Iowa.

I claim the within described process for plating iron and steel, substantially as herein described.

62,707.—ATTACHMENT FOR HEATING KETTLES AND BOILERS BY GAS.—Mary Van Vranken, Washington, D. C.

I claim a perforated stand attached to the bottom of a kettle or boiler, and adapted to be used upon an ordinary gas burner, substantially as and for the purpose specified.

62,708.—WASHING MACHINE.—C. F. Walker, Benfords Store, Pa.

I claim the combination of the dashers, B B, valves, 6, lever, C, weight, D, and tub, A, as and for the purpose specified.

62,709.—ENVELOPE FOR SPITTOONS.—S. W. H. Ward, New York City.

I claim the spittoon envelope with the perforation, E, in the bottom for the purpose of raising the spittoon out of the cavity which contains it, when it is desired to remove it, substantially as set forth.

62,710.—STEAM ENGINE.—George I. Washburn, Worcester, Mass.

I claim, First, The arrangement of the cylinders, A C, with their double acting pistons, B D, and valve with three disks reciprocating in the chamber between the cylinder and controlling the ports, substantially as described.

Second, I claim the steam valve when arranged to be operated by pressure from below and an eccentric above, substantially as described.

62,711.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

I claim an arrangement of cylinders and steam parts by which the steam, after being used on one piston is permitted to flow to the other side of the same piston and to the other cylinder to be used expansively, substantially as described.

I claim the arrangement of the double-disk hollow valve, H, operating substantially as described.

62,712.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

I claim the arrangement of the two cylinders with single acting pistons and the larger cylinder with a double acting piston upon whose sides the steam from the other cylinders is used expansively, substantially as described.

62,613.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

First, I claim the arrangement upon one piston rod of the double-acting operating piston in its own cylinder and a valve or valves attached to said piston rod and operating within a valve chamber in line with said cylinder, substantially as described.

Second, I claim the combination with each other of two such arrangements as expressed in the above claim, the valves attached to a given piston rod in each case governing the induction and eduction parts of the opposite steam cylinder, in which reciprocates the other piston rod, substantially as described.

Third, I claim a valve operating in connection with an exhaust port or pipe, to permit the egress of steam and prevent reflux thereof, for the purpose described.

62,714.—FILTER.—George Waite, New Orleans, La., administrator of the estate of John Watts. deceased.

I claim a water filter and cooler having the chamber, B, the cylinder, H, perforated at a, filtering material, C, cylinder, H', perforated at a', chamber, D, and clear water chamber, E, all arranged as herein set forth, for the purpose specified.

62,715.—APPARATUS FOR MAKING VINEGAR. — Wendelin Weis, St. Paul, Minn.

I claim an apparatus for making vinegar which consists of the boxes, C C, troughs, D D, or blocks, F or G, all made and operating substantially as and for the purpose herein shown and desdribed.

62,716.—PLATE LIFTER.—Dan Welch, Lowell, Mass., assignor to H. A. Hildreth, Lowell, and W. J. Johnson, Newton, Mass.

I claim the combination of the fixed and swinging jaws, B and C, arranged substantially as described and for the purpose fully set forth.

62,717.—OINTMENT FOR TREATING DISEASES IN HORSES AND OTHER ANIMALS.—John S. Williams, Warsaw, Ohio.

I claim the improved Spanish ointment for treating the diseases of horses, prepared substantially as herein set forth and described.

62,718.—PORTABLE FENCE.—Eli York, Windsor, Ill.

I claim the combination of the post, A, mud sills, B, braces, C, planks, D, connecting bars, E, and cross bars, G, substantially as described for the purpose specified.

62,719. — SHIFTING RAIL FOR CARRIAGE SEATS. — Joseph Zahm, Fredonia, N. Y.

I claim the joint and lever above described and the use and application of the same for the uses and purposes above described.

62,720.—HINGE.—John Hartzell Zinn, Idaville, Pa., assignor to himself and Peter D. Johns.

First, I claim attaching the socket or knuckle, c, to the leaf centrally so as to project equally on each side of the leaf at the point of attachment, substantially as herein shown and described.

Second, I claim the leaves, A and B, constructed with the parts, a and b, of different thickness and arranged to shut together, as shown and described.

Third, I claim a loose joint butt hinge, constructed and arranged to operate as herein set forth.

62,721.—STEAM VALVE.—John Zundorff, New York City.

I claim the expansive movable ring, b, with longitudinal slot, n, and ports, m m', when constructed substantially as described and for the purposes set forth.

62,722.—SAFETY VALVE.—John Zundorff, New York City.

I claim the spherical-formed pipe, p, in combination with the ports, G G' G'' G''', when constructed and operated substantially as described.

Second, The combination of the valve, F, and ports, G G' G'' G''', for the purpose specified.

Third, The spring, b, in combination with the piston, d, shippers, g and f, when operated as above described.

62,723.—PROPELLER.—R. D. Chatterton, Bath, England.

First, I claim the arrangemedt of the valved diaphragms, G G', in the tube, A, constructed as described and operated simultaneously by means of a connecting device of rack and wheel, or equivalent, for the purpose specified.

Second, The arrangement of the valves, G G' H H' the racks and pinions and the reversing apparatus, I J K, or equivalent device, as set forth.

Third, I claim the combination with the longitudinal tube, A, of the direct action engine and pump acting between valved diaphragms connected for simultaneous adjustment and reversal, substantially as described.

REISSUES.

2,500.—WAGON.—Edgar Huson, Ithaca, N. Y.—Patented Feb. 17, 1857.

First, I claim as my invention the use of two or more side splinter bars, when they extend from any convenient point at or near the forward ends of the side springs to the head block; and the use of the said splinter bars whether attached directly to the forward ends of the said side springs, or by any convenient means intervening between them, as described.

Second, I claim fastening the pole or thills to the side splinter bars, or other convenient part of the platform or frame at or near or in rear of the ends of the side springs, as described.

Third, I claim so making the frame or platform as to leave the extremities of it open so as to receive the pole or thills between and back of the forward ends of the side springs, thus bringing the team or horse nearer the wagon thereby lessening the draft and requiring less room in which to turn.

2,501.—FORMING EMERY WHEELS AND GRINDING AND POLISHING SURFACES.—The New York Quartz Company, New York City, assignees by mesne assignments of George E. Van Derburgh. Patented Jan. 7, 1862.

I claim, First, The combination of the particles of emery or other gritty or cutting materials into an artificial stone or substance for grinding, polishing or other purposes by the vitrifaction or partial vitrifaction of any suitable vitriscent flux previously intermingled with said particles, all substantially in the manner herein set forth.

Second, The combination of sand or particles of emery, ground glass, or any other suitable gritty or cutting particles with an alkaline silicate or other vitrescent flux for the purpose of producing an artificial grinding and polishing stone, by the vitrifaction of said flux under the influence of heat, substantially in the manner herein set forth.

Third, I claim also curing and hardening a plastic combination of gritty particles with a vitrescible flux by first subjecting the same to a moderate heat until dry and afterwards to the action of a higher temperature until a partial or entire vitrifaction of the flux is produced. substantially in the manner herein set forth.

NOTE.—FIFTY-FIVE patents in the above list were obtained through the agency of the Scientific American.

EXTENSION NOTICES.

Lucy A. Pope, administratrix of the estate of Augustus R. Pope, deceased of Somerville, Mass., having petitioned for the extension of a patent granted to the said Augustus R. Pope on the 21st day of June, 1853, for an improvement in electro-magnetic alarms, for seven years from the expiration of said patent, which takes place on the 21st day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of June next.

Alexander J. Walker, of New York City, having petitioned for the extension of a patent granted to him on the 24th day of May, 1853, for an improvement in spirit lamps, for seven years from the expiration of said patent, which takes place on the 24th day of May, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of May next.

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten. —

Erfindigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden. Man adressire

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Extensions.--The applicant for an extension must file is petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has nce expired. The preliminary business to extend a patent should be commenced at least six months prior to the expiration.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension; but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & CO., 37 Park Row, N. Y.

Reissues.--A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue.

Reissued patents expire at the same time that the original patent would have done. For this reason, applications for reissue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reissue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reissues, the original claim is subject to re-examination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

The documents required for a Reissue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $30 for preparing and attending to the case. Total ordinary expense, $60. Reissues may be applied for by the owners of the patent.

By means of Reissue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reissued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reissue with new claims which shall specially meet the infringers.

On making application for Reissue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reissue, the applicant should send to us the original patent, remit as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & CO., 37 Park Row, New York. We have had great experience in obtaining Reissues.

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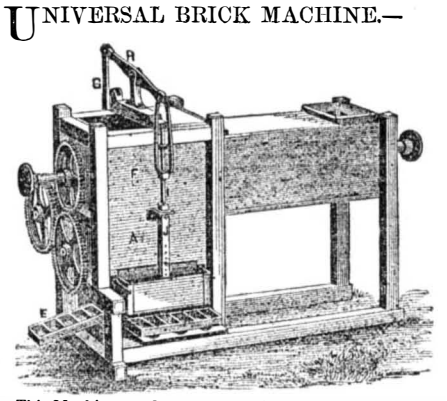

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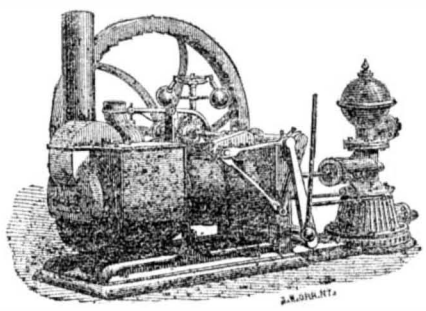

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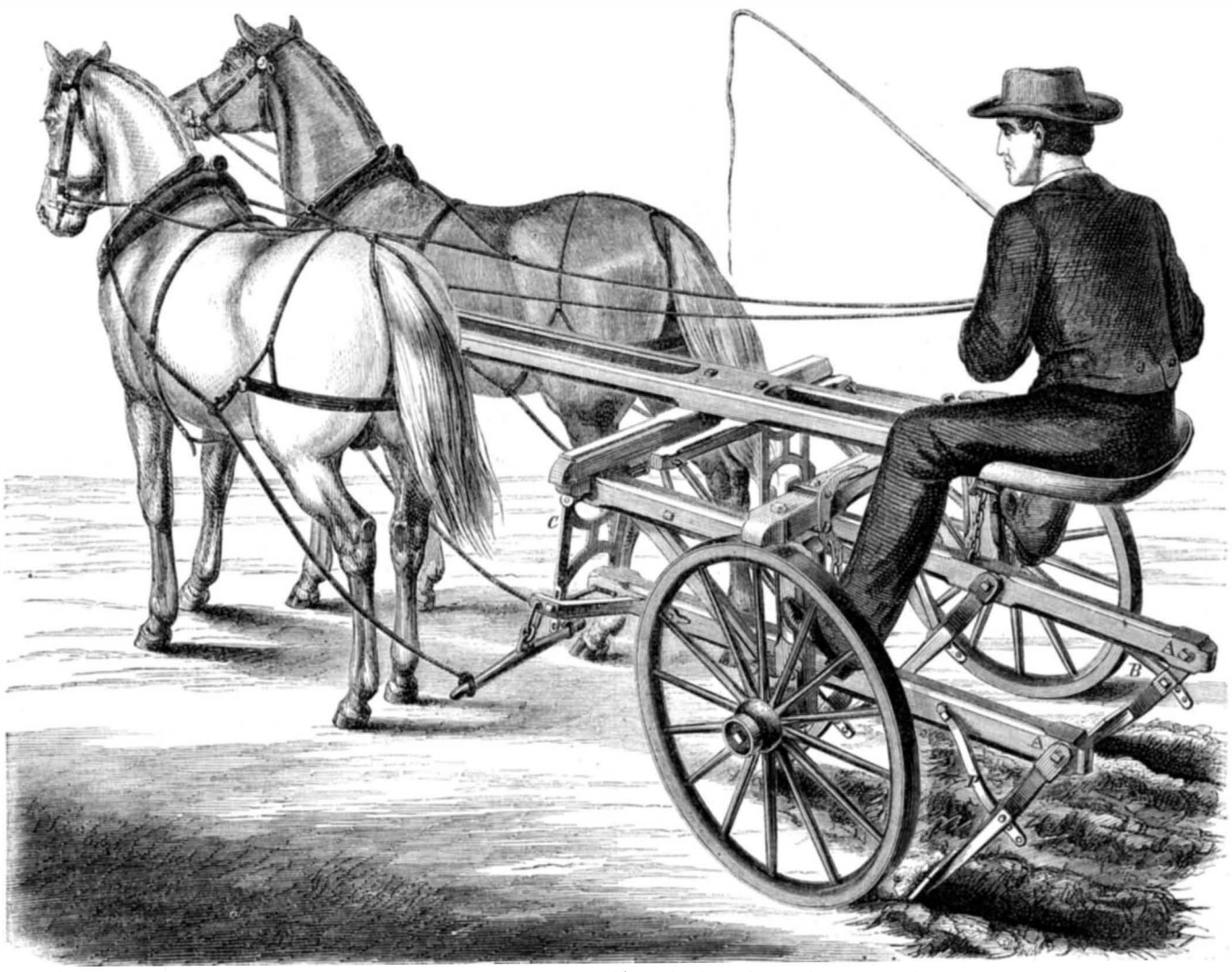

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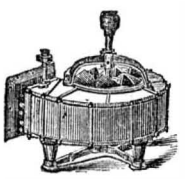

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